AUTOMOTIVE INDUSTRIES

DECEMBER 1, 1953

AUTOMOTIVE and AVIATION MANUFACTURING
CIVILIAN AND DEFENSE
ENGINEERING • PRODUCTION • MANAGEMENT

In This Issue... London Show Highlights · · · Fairchild Jet Engine · · · '54 Cars and Trucks · · · Automatic Assembly Line for TurboCompound Aircraft Engine · · · ASBE and SAE Meetings · · · Piper's New 2-Engined Plane

COMPLETE TABLE OF CONTENTS, PAGE 3

A CHILTON PUBLICATION

What's YOUR problem?

A. L. Seabaugh, who makes his headquarters at Standard's Chicago office, is the cutting oil specialist who recommended STANICUT Cutting Oil to operators of this midwest company and helped them solve a tarnish problem.

A. L. Seabaugh is one of a corps of able lubrication specialists who have headquarters in Standard offices throughout the Midwest. These men have been specially trained in Standard Oil Lubrication Engineering Schools and, in addition, have a wealth of practical experience. The specialist nearest your plant will work closely with you, giving you the help you need when you need it, to produce better cutting oil results. Phone your local Standard Oil office for his services.

STANICOOL HD Soluble Oil—Because it contains additional compounding, this heavy-duty soluble oil possesses not only the cooling ability of an emulsion but also the ability to give better tool life and finer finishes than can be obtained with a conventional soluble oil.

STANOSTAMP Compounds—Here are three established products for stamping or heavy drawing operations of either low-carbon or alloy steels. Water can be added to these paste compounds to provide the most economical applications. STANOSTAMPS offer maximum protection for dies and work. These compounds can be removed readily in conventional washing equipment.

Stops tarnish on copper alloy jobs . . .

● Sciaky Brothers, Inc., Chicago manufacturers of spot welding equipment, were having trouble obtaining a suitable finish on certain copper alloy parts. After they were machined, parts frequently had to be processed to remove stain or tarnish.

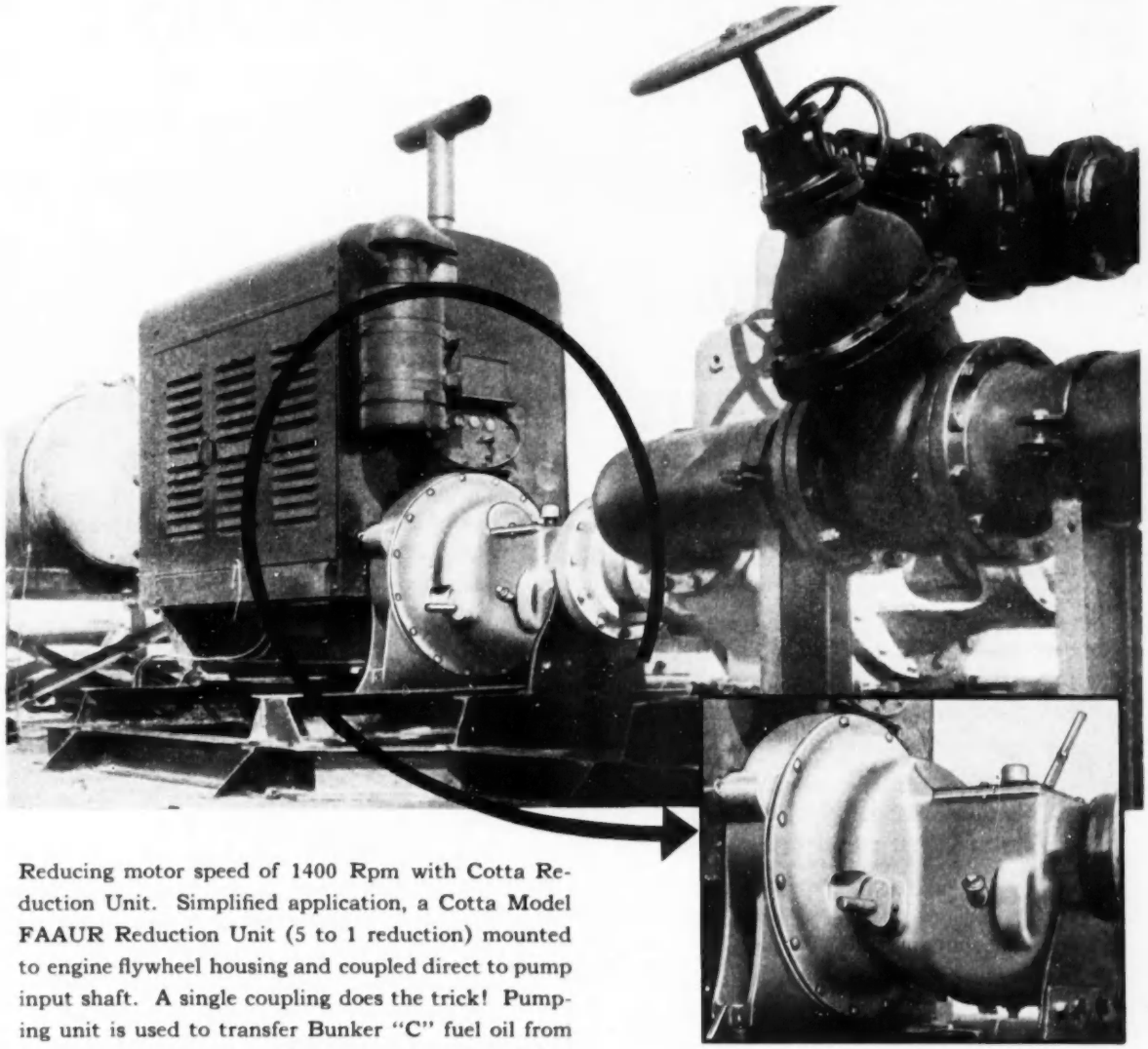
Upon the advice of a Standard Oil cutting oil specialist, officials of this company put a STANICUT Cutting Oil to work on the troublesome copper alloy machining jobs. It was the end for tarnish troubles. On a wide variety of operations employing many different copper alloys, STANICUT has provided both superior finish and excellent tool life. Of further importance to this company, STANICUT is now used for all operations requiring a cutting oil. This has eliminated the cost and trouble of stocking and using several different cutting oils.

To help you get better cutting oil results, Standard Oil has a metalworking service that is unique in the Midwest. It gives you the metalworking products, the engineering service, and the supply service that fit your special operation and needs. The cutting oil specialist serving in your section of the Midwest will be glad to tell you more about this personalized service. You can reach this man easily by phoning your local Standard Oil office.

STANICUT
TRADE MARK
Cutting Oil

STANDARD OIL COMPANY STANDARD *(Indiana)*

Simplified—Economical Pump Drive with COTTA *Reduction Unit*



Reducing motor speed of 1400 Rpm with Cotta Reduction Unit. Simplified application, a Cotta Model FAAUR Reduction Unit (5 to 1 reduction) mounted to engine flywheel housing and coupled direct to pump input shaft. A single coupling does the trick! Pumping unit is used to transfer Bunker "C" fuel oil from barges to storage tanks. Customer reports installation is "very good looking . . . highly satisfactory". What speed reduction problem do *you* have?

Cotta Reduction Units come in a broad range of ratios, with input torque from 150 to 1350 foot pounds. For use on cranes, shovels, rock crushers, pumps, generators, etc.

THIS INFORMATION WILL HELP YOU

Diagrams, capacity tables, dimensions and complete specifications sent free on request. Just state your problem — COTTA engineers will help you select the right unit for best performance. May we work with you?

COTTA TRANSMISSION CO., ROCKFORD, ILLINOIS

An Assurance of Dependable Service

COTTA

HEAVY-DUTY REDUCTION UNITS

"Engineered-to-order"

After 199,000 miles of service...fleet owner reports "no appreciable wear" on Ni-Resist armored ring band pistons used in Buda Model 844 heavy duty engine. This user, operating 738 Diesel powered freight trucks and trailers in mountainous territory, expects considerably more mileage before replacing pistons of this type.

After 41,078 miles... the top ring groove failed in this conventional-type aluminum piston. Records show distinct improvements attained by use of armored ring bands of Ni-Resist which become an integral part of pistons when bonded to the aluminum alloy by the Al-Fin process, developed by FAIRCHILD ENGINE AND AIRPLANE CORP.

5 times the mileage with Ni-Resist* ring grooves

A large fleet owner, operating gasoline engine powered trucks and trailers in the Rocky Mountain area averages 250,000 miles per set of aluminum pistons with bonded-in Ni-Resist® ring bands.

This is a typical performance, as shown by numerous reports reaching UNITED ENGINE & MACHINE COMPANY, San Leandro, California, a pioneer in producing Ni-Resist armored ring band pistons, sold under the trade-name DUALOY.

Some of these bi-metallic pistons are now in their third 250,000 mile operating runs after being twice reground to the next smaller oversize.

Use of Ni-Resist eliminates ring groove wear troubles. Accordingly, it helps to prevent blow-by and reduces oil consumption. In addition, it resists corrosive attacks from chemically treated fuels.

Maximum piston life made possible by using Ni-Resist ring bands results in additional profit from increased mileage between overhauls... and substantial reduction of downtime expense.

Ni-Resist is specified because it combines outstanding resistance to heat, corrosion, metal-to-metal wear and galling. Equally important is the high thermal expansion of Ni-Resist Type 1 which nearly matches that of the aluminum piston alloy.

Other established Ni-Resist engine applications are cylinder liners, valve guides and exhaust system parts.

Investigate Ni-Resist for original equipment parts when designing new heavy duty engines — also for any problems involving corrosion, wear, heat and other destructive forces. We'll gladly supply you with information on the varied uses and types of Ni-Resist.

At the present time, nickel is available for end uses in defense and defense supporting industries. The remainder of the supply is available for some civilian applications and governmental stockpiling.

* *No other cast metal provides such a useful combination of engineering properties.*

INCO

THE INTERNATIONAL NICKEL COMPANY, INC. A.I. 12-1-53
Dept. 20, 67 Wall Street, New York 5, N. Y.
Please send me booklets entitled, "Engineering Properties and Applications of Ni-Resist," and, "Buyers' Guide for Ni-Resist Castings."

Name _____ Title _____

Company _____ Address _____

City _____ State _____

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

A CHILTON MAGAZINE AI PUBLISHED SEMI-MONTHLY

AUTOMOTIVE INDUSTRIES

DECEMBER 1, 1953 VOL. 109, NO. 11

EDITORIAL STAFF

James R. Custer, Editor
H. H. Roberts, Engineering Editor
Thomas Mac New, Market Research Editor
Paul C. Kennedy, Machinery Editor
Andrew Shearer, News Editor
Robert P. Homer, Art Editor
Marcus Ainsworth, Statistical Editor
Howard Kohlbrenner, Art Director

DETROIT
Joseph Geschelin, Detroit Editor
Leonard Westrate, News Editor, Detroit

WASHINGTON
George H. Baker, Washington Editor
Karl Rannells, Washington News Ed.
Ray M. Stroupe, Washington News Ed.

LOS ANGELES
R. Raymond Kay, Pacific Coast Editor

PARIS
W. F. Bradley, European Correspondent

Paul Wooton, Washington Member, Editorial Board

As part of its worldwide automotive and aviation news coverage, AUTOMOTIVE INDUSTRIES is serviced by International News Service and has editorial correspondents in major United States and foreign industrial centers.

FEATURES

Body Engineers Convention. *By James R. Custer*.. 48
Lincoln 1954 Improvements 50
Chevrolet Trucks Have More Powerful Engines.. 51
Wright Turbo Compound Engines are Built on Automatic Assembly Lines at Wood Ridge Plant 52
Studebaker Introduces New Brake for 1954..... 56
Novel Jet Engine is Designed for Production.... 58
FWD Has New Line of Trucks for 1954..... 60
New Nash Rambler Sedan on 108-in. Wheelbase.. 61
London Motor Show. *By Robert Braunschweig*... 62
New Features Added to GMC Trucks for 1954.... 66
Builders-Users of Aircraft Discuss Hydraulic Problems. *By Joseph Geschelin*..... 67
Piper's New Twin-Engined Plane..... 68
Three SAE Meetings. *By Thomas Mac New*..... 70
Lessons from the Livonia Fire 105

NEWS PREVIEWS

GM to Float Huge Debenture Issue 33
Ford Assets Increased $173 Million in 1952..... 33
Hudson Adds Utility Car to 1954 Model Line.... 33
Chrysler Out for Greater Share of Market..... 34
Thomas Says Red China May Open for Trade.... 35
Chevrolet Powerglide Production at 1.5 Million.. 36
English Firm to Make Ross Hydrapower Unit.... 36
Details of Douglas X-3 Disclosed by Air Force.... 36
Willow Run Sale Milestone in Kaiser History.... 37
Dodge Separates Car, Truck Sales Staffs..... 38
Westinghouse to Move Jet Work to Kansas City 38
Cooperation Among Independents Seen 39
Chrysler Power Steering Unit Ready for Output 98

DEPARTMENTS

High Spots of This Issue..... 31
News of the Automotive and Aviation Industries.. 33
Men in the News 40
Machinery News. *By Thomas Mac New*..... 79
New Plant and Production Equipment..... 81
New Products 87
Free Literature and Free Information Service.... 89
New Products for Aircraft..... 92
Metals. *By William F. Boericke*..... 94
Observations. *By Joseph Geschelin*..... 96
Shorties 116
On Our Washington Wire..... 120
Calendar of Coming Events..... 140

Business Department Staff..... 31
Chilton Officers and Directors..... 31
Advertisers' Index 160

MEMBER SBME Society of Business Magazine Editors

Copyright 1953 by Chilton Company (Inc.)

NBP National Business Publications, Inc.

ABC Audit Bureau of Circulations

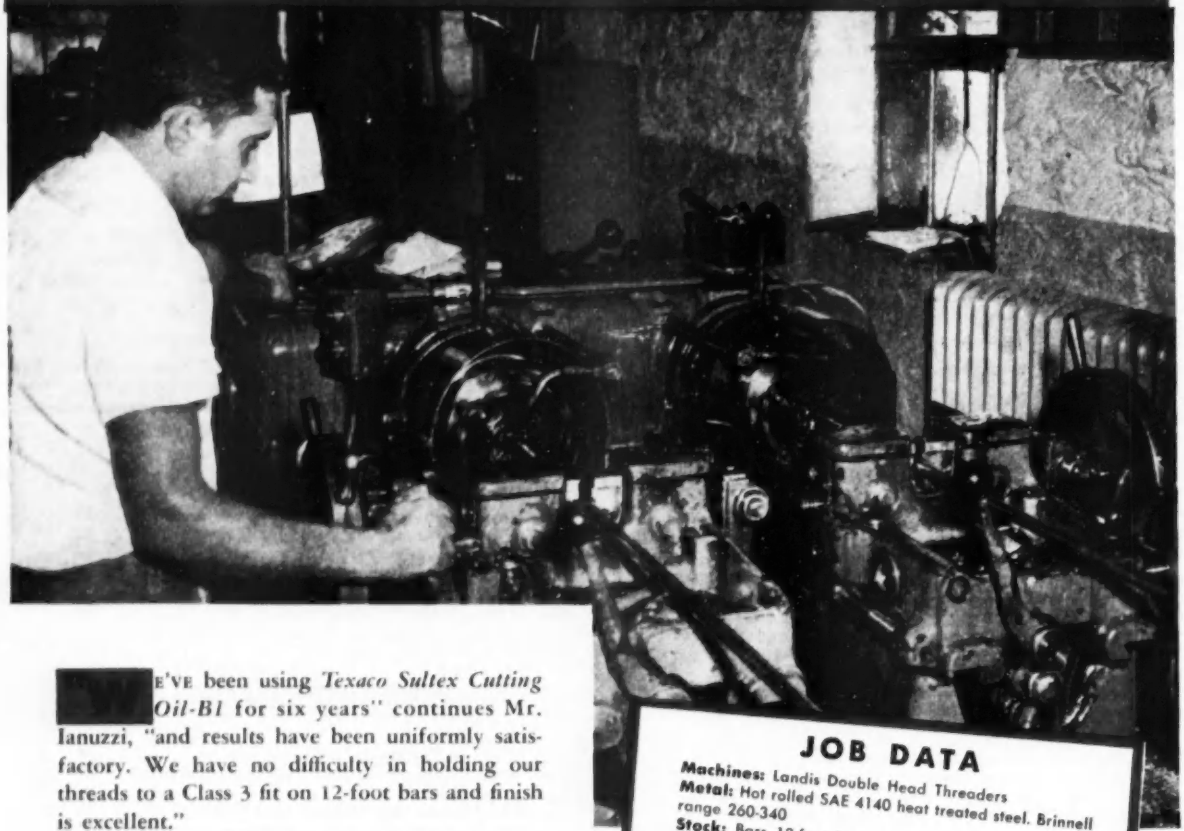
AUTOMOTIVE INDUSTRIES is a consolidation of The Automobile (weekly) and the Motor Review (weekly) May, 1902; Dealer and Repairman (monthly), October, 1902; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

EDITORIAL EXECUTIVE OFFICES, Chestnut and 56th Sts., Philadelphia 39, Pa., U. S. A. Cable address—Autoland, Philadelphia.

AUTOMOTIVE INDUSTRIES. Published semi-monthly by Chilton Co., Chestnut & 56th Sts., Phila. 39. Entered as Second Class Matter October 1, 1925, at the Post Office at Philadelphia, Pa.; Under the Act of Congress of March 3, 1879. In case of Non-Delivery Return Postage Guaranteed. Subscription price: United States, United States Possessions, 1 year $2.00, 2 years $3.00. Canadian and Foreign, 1 year $5.00, 2 years $8.00; single copies, 25 cents, except Statistical Issue (Mar. 15th), $1.00.

"Texaco gives us CLEAN CUT THREADS AND LONG CHASER LIFE"

says Emil Ianuzzi
Vice President in Charge of Production
R.E.C. Corporation, New Rochelle, N.Y.



"We've been using *Texaco Sultex Cutting Oil-B1* for six years" continues Mr. Ianuzzi, "and results have been uniformly satisfactory. We have no difficulty in holding our threads to a Class 3 fit on 12-foot bars and finish is excellent."

On cutting and grinding jobs of all kinds — on all kinds of metal — Texaco is helping operators work faster, get better results, and reduce costs.

There is a complete line of *Texaco Cutting, Grinding and Soluble Oils.* A Texaco Lubrication Engineer specializing in metal working operations will gladly help you select the right ones for your jobs and assist you in other ways to improve your machining.

JOB DATA

Machines: Landis Double Head Threaders
Metal: Hot rolled SAE 4140 heat treated steel. Brinnell range 260-340
Stock: Bars 12-feet long, diameters from ½" to 2½"
Job: Threading bar entire length
Threads Cut: U.S. Vee, Acme and Buttris — 8 to 18 pitch
Cutting Oil: *Texaco Sultex Cutting Oil-B1*

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

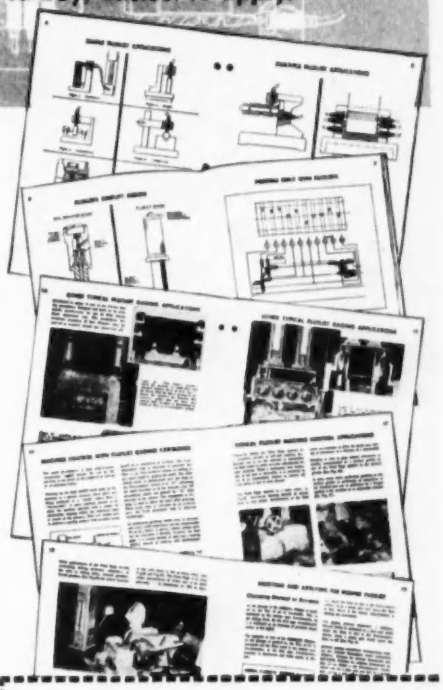
TEXACO CUTTING, GRINDING AND SOLUBLE OILS FOR FASTER MACHINING

TUNE IN . . . METROPOLITAN OPERA radio broadcasts every Saturday afternoon. See newspaper for time and station.

Design and Make your own
AIR GAGING AND MACHINE CONTROLS
WITH
"PLUNJET"
GAGING CARTRIDGES

free booklet tells how

24 PAGES tell how and where you can use PLUNJETS to save thousands of hours and dollars in gaging and machine control applications. Gaging ranges .001 to .080, amplifications 62.5 to 5000 to 1. PLUNJETS are smallest in size, thriftiest to buy, easiest to apply.



"GREATEST ADVANCEMENT IN AIR GAGING SINCE THE INTRODUCTION OF PRECISIONAIRE"

That's what many have said of this "gaging cartridge of 10,000 uses." During the last four years thousands of PLUNJETS have gone into use on a wide variety of gaging and machine control applications. More than five thousand are on gages for checking jet engine blades.

NOW, PLUNJETS ARE AVAILABLE TO YOU—immediate delivery from stock of 36 different ranges, styles and types, at least one of which is suitable for your requirements.

SAVE BY SENDING THIS COUPON NOW for your own copy of PLUNJET ENGINEERING DATA.

GAGE DIVISION, DEPT. 2
THE SHEFFIELD CORPORATION
DAYTON 1, OHIO, U.S.A.

6577

PLEASE RUSH
PLUNJET ENG. DATA

SIGNED_____

POSITION_____

COMPANY_____

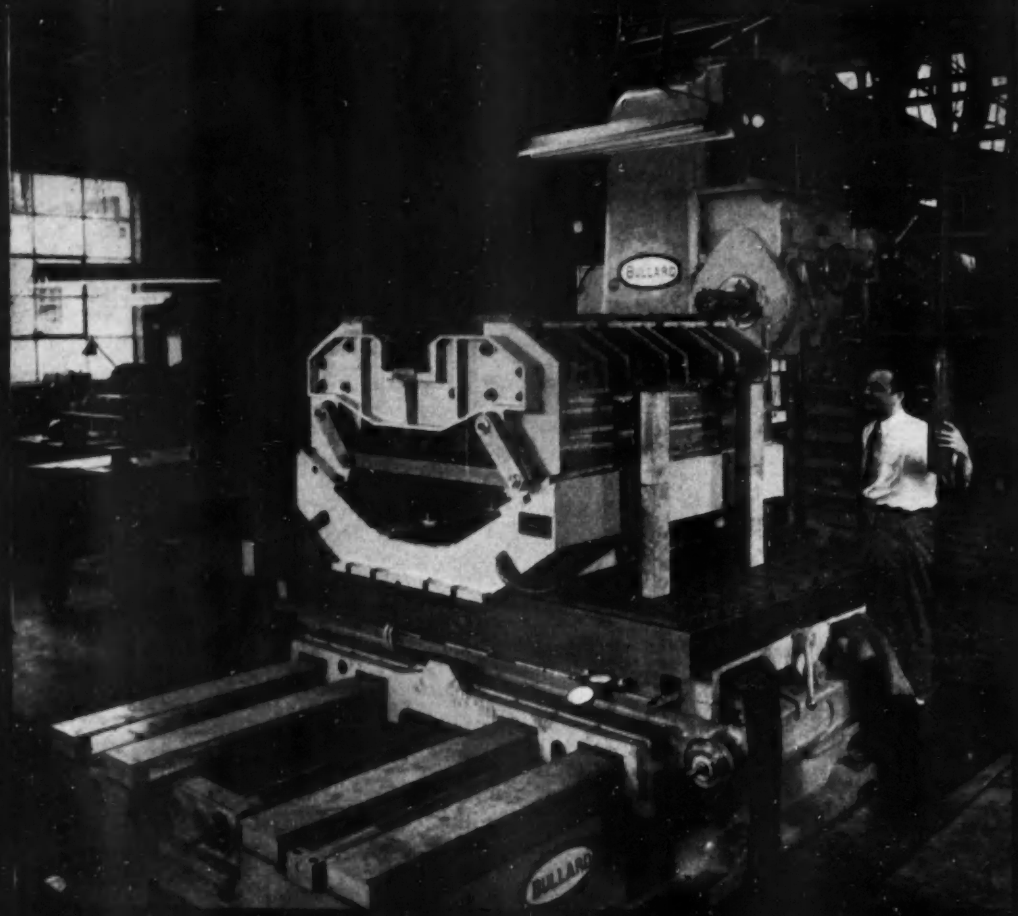
STREET_____

CITY_____ **ZONE**___ **STATE**____

MASTER CRAFTSMAN SHEFFIELD HEADQUARTERS

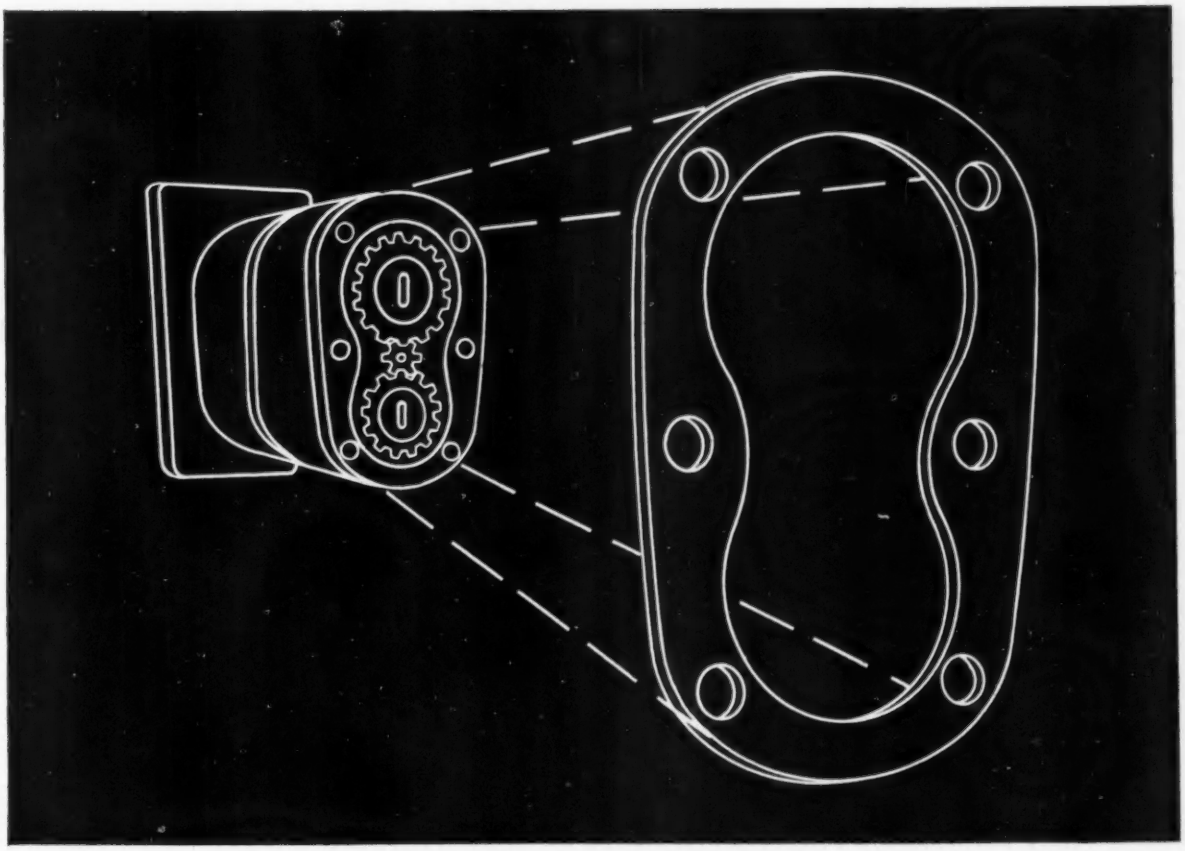
SHEFFIELD

ENGINEERED BY BULLARD



To _____
Make Light Work
Of Tough Jobs

Telephone
6-2511



New fiber gasket keeps food clean

When you mix salad oil with lubricating oil, you get an "explosive" mixture. At least that's what one manufacturer of commercial food processing machinery discovered when complaints began to roll in from customers who didn't relish the contamination caused by leaky gaskets.

Investigation showed that the fiber gaskets then being used tended to wick. Over a period of time, too, they'd dry out, shrink, and then begin to leak. Since their replacement gaskets dried out also during storage, leaks were chronic.

In a field where no leaks at all can be tolerated, this manufacturer had to find a sound yet economical answer to his problem. He got it in Armstrong's new fiber material—Accopac®.

Months of careful field testing proved that, with Accopac gaskets, lubricating oil and grease stayed where it belonged, where it could lubricate and not contaminate.

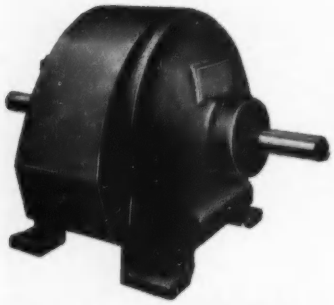
Now more than thirty different Accopac gaskets are used on this food processing equipment. Of course, replacement gaskets, too, are now made of Accopac because they don't deteriorate.

Won't shrink or dry out. Accopac is a new kind of fiber gasket material. Its rubber latex binder goes into the beater before the sheets are formed. This patented process locks the fibers in rubber, makes Accopac impervious and dimensionally stable, while its cork content adds compressibility.

Today, Accopac is being used in thousands of applications—in gasoline engines, in pumps, aircraft, washing machines—wherever there's a need for efficient sealing at low cost.

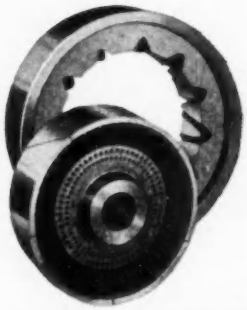
FREE GASKET MANUAL. For details about Accopac and other gasket materials, send for free, 24-page manual, "Armstrong's Gasket Materials." Contains latest specifications as well as data on the design and use of gaskets. Write Armstrong Cork Company, Industrial Division, 7012 Imperial Avenue, Lancaster, Penna.

ARMSTRONG'S ACCOPAC

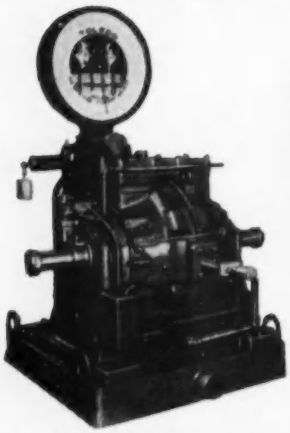


AIR COOLED COUPLINGS

AJUSTO-SPEDE MOTORS



AIR COOLED BRAKES



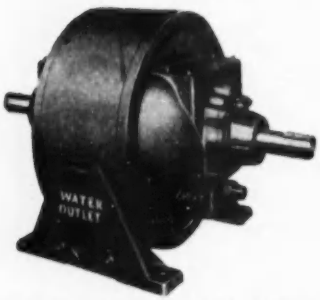
ABSORPTION DYNAMOMETERS

EATON

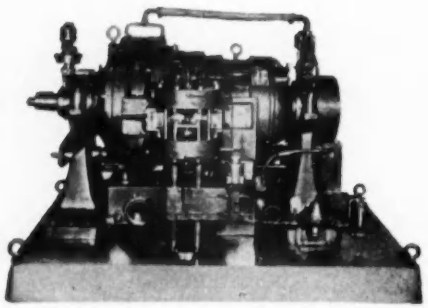
DYNAMATIC

EDDY-CURRENT ROTATING EQUIPMENT

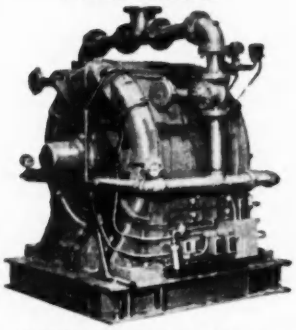
PRESS DRIVES



LIQUID COOLED COUPLINGS



UNIVERSAL DYNAMOMETERS



LIQUID COOLED BRAKES

Dynamatic Eddy-Current electro-magnetic equipment represents the ideal solution for a wide range of adjustable-speed drive problems, particularly where an AC power source is a requirement. Typical applications include paper machine drives, cement mill drives, industrial truck clutches, press drives, crane brakes, fan drives—in fact, practically all test, processing, and conveying equipment common to industry. Instantaneous response and accurate control are important advantages.

Write for your copy of Bulletin GB-1 which describes and illustrates the basic Dynamatic units.

DYNAMATIC CORPORATION KENOSHA • WISCONSIN

Subsidiary of EATON MANUFACTURING COMPANY, Cleveland, Ohio

The operator brings the rotating lapping stone into contact with work centers to correct inaccuracies.

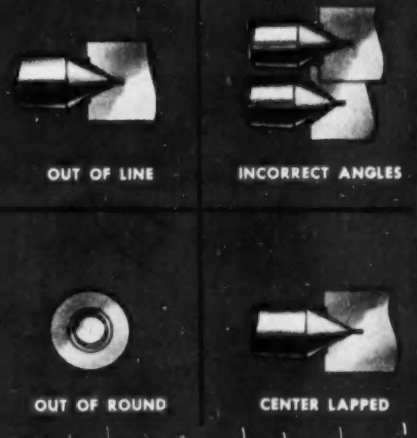
EX-CELL-O

CENTER LAPPING MACHINES

FOR GREATER PRECISION IN SUBSEQUENT MACHINING

Meeting today's precision standards requires careful checking of every phase of the job, *including the center holes in the work*. Ex-Cell-O Center Lapping Machines correct inaccuracies of center holes, thus contributing to greater precision in all subsequent operations performed between centers. These machines are precision built and are easy to operate. The lapping stone is dressed to a 60° angle by a hand operated diamond dresser. An adjustable dresser for other angles also is available. These machines are fully described in Bulletin 40271—a copy is yours for the asking.

Eliminate out-of-line, out-of-round, and incorrect angles by Center Lapping



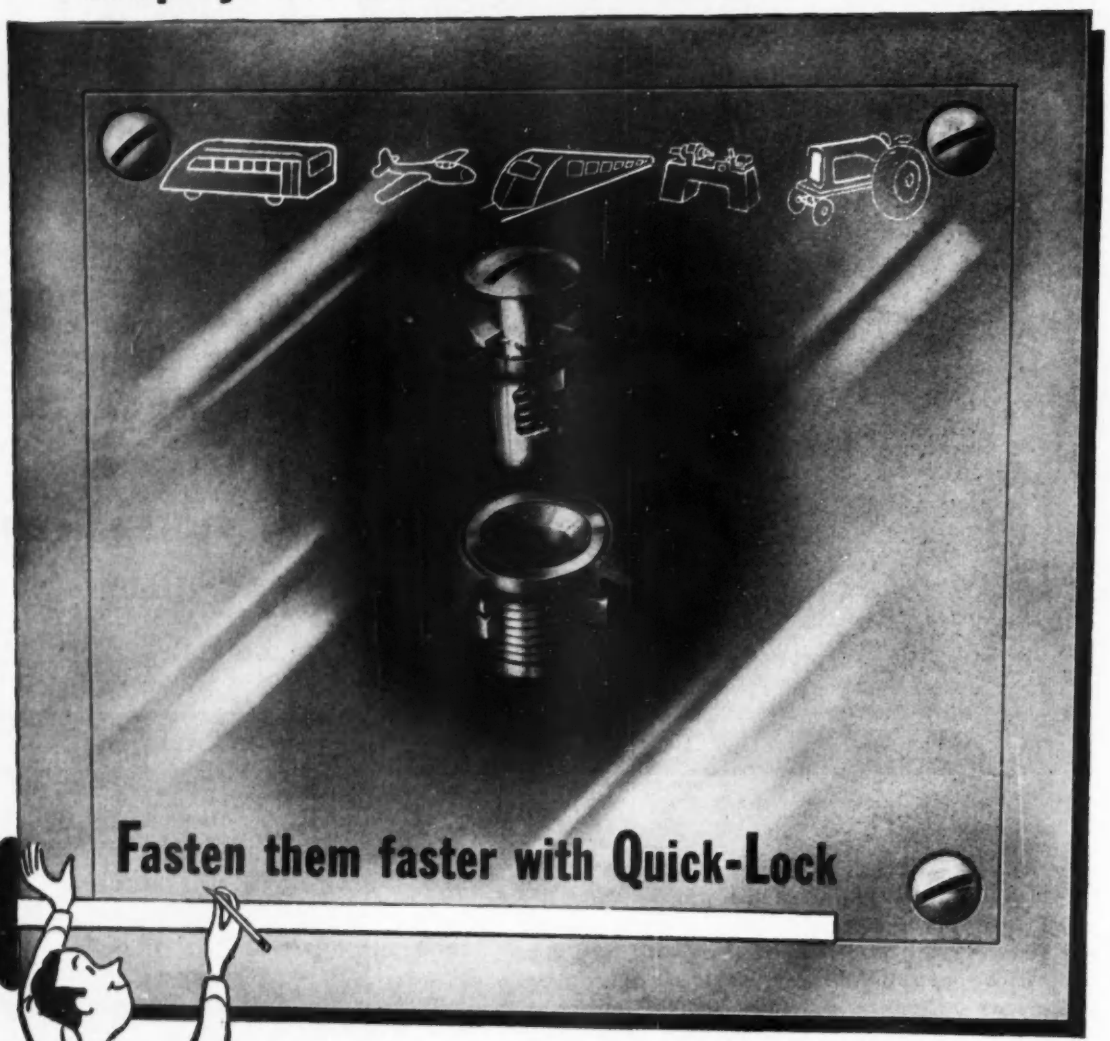
EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

XLO
EX-CELL-O for PRECISION

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
DAIRY EQUIPMENT • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS

53-44

Simplify Your Access Panel and Door Assemblies...



Fastening removable access doors and panels need not be a laborious and costly production or assembly operation—not if they're fastened with QUICK-LOCK.

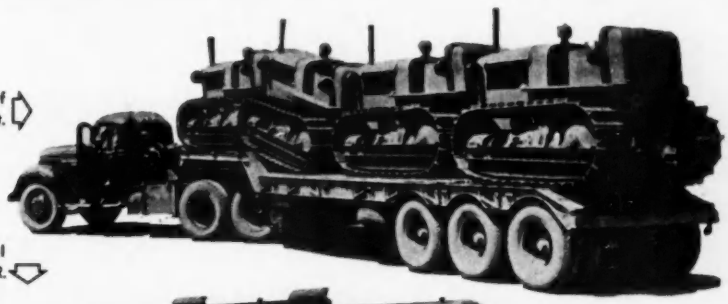
Designed for simple installation, QUICK-LOCK requires no special tools. It speeds up mounting and demounting detachable panels with only a 90° turn required to lock and unlock it *in a jiffy*.

The flexible mounting and tapered stud makes QUICK-LOCK ideal for assembling curved sheets and insures a tight fit when locked. Stud is self-ejecting when unlocked. Minimum deflection is assured—only initial loads are carried by the helical spring. Solid supports take up increased loads.

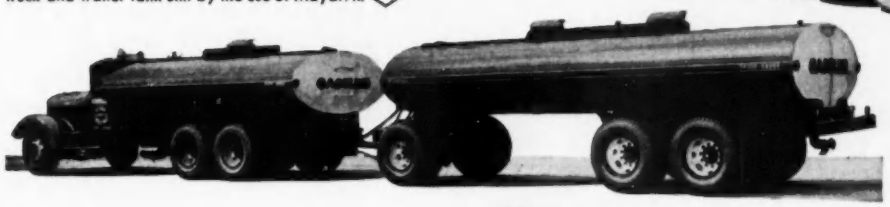
Industrial and agricultural equipment manufacturers would do well to analyze the cost-saving features of QUICK-LOCK's simple design. A good way would be to call in a Simmons Engineer and discuss the economy of a QUICK-LOCK installation as compared to your present fastening method. Why not send for him today?

SIMMONS FASTENERS

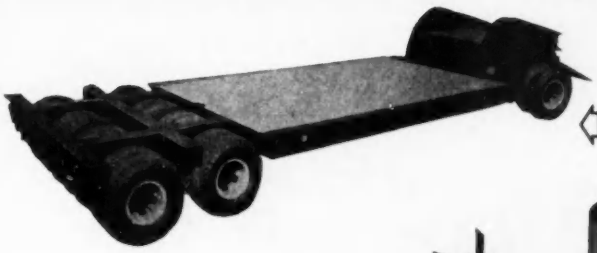
SIMMONS FASTENER CORPORATION • 1749 NORTH BROADWAY, ALBANY 1, N. Y.



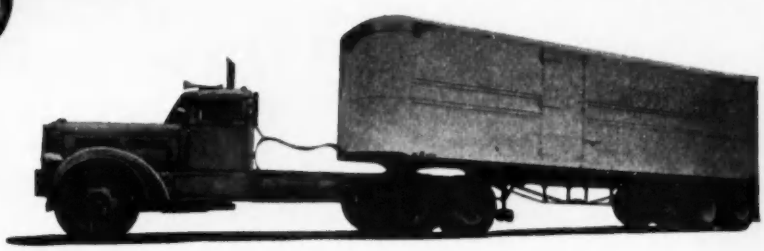
This low-bed trailer has an axle capacity of 66,000 lb. Mayari R reduced its weight 12.5 pct.



Deadweight was reduced 22 pct in this 6000-gal truck-and-trailer tank unit by the use of Mayari R.



Mayari R helped to reduce the deadweight of this 50-ton-capacity gooseneck trailer by 35 pct.



Built of Mayari R, this frozen-food trailer weighs 19.9 pct less than a similar unit built of carbon steel.

WHAT IS IT WORTH TO ADD 20% TO PAYLOAD CAPACITY?

How much do you think it would add to the value of a truck, trailer, or tanker to decrease its deadweight by 20 pct, and increase its carrying capacity by an equal amount?

This can be done readily, without exceeding the legal axle-load limits. And it can be done economically, by designing a vehicle to be built of Mayari R low-alloy, high-strength steel.

Yes, Mayari R does cost more than carbon steel—but it takes less of it to do the job. It can be used in thinner sections because it has a yield point almost double that of plain carbon steel, and it has from 5 to 6 times as much resistance to atmospheric corrosion. It retains paint 20 pct to 80 pct longer, depending upon the type used. Also, it can be fabricated and welded by the same methods and with the same equipment that are ordinarily used for carbon steel.

If you would like more information on the properties and advantages of this superior grade of steel, write or phone for Mayari R Catalog 259.

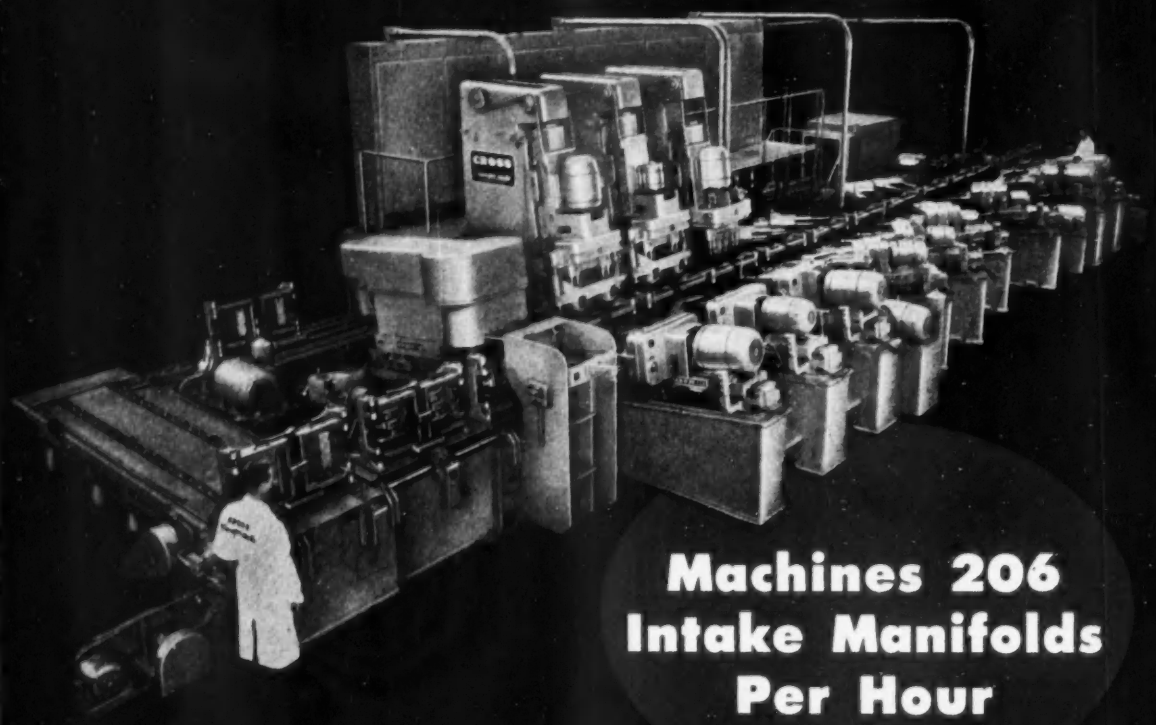
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R *makes it lighter...stronger...longer lasting*

Another Transfer-matic by Cross



Machines 206 Intake Manifolds Per Hour

- ★ Two parts machined at one time in each station.
- ★ 100 operations—two milling, 48 drilling, four boring, 20 chamfering, four spotfacing, and 22 tapping.
- ★ 14 stations—one loading, one unloading, 12 working.
- ★ Palletized work holding fixtures with power wrenches for automatic clamping.
- ★ Integral conveyor for automatic return of palletized fixtures from unloading to loading station.
- ★ Other features — automatic chip removal; hardened and ground ways; automatic lubrication system; J. I. C. standard construction.

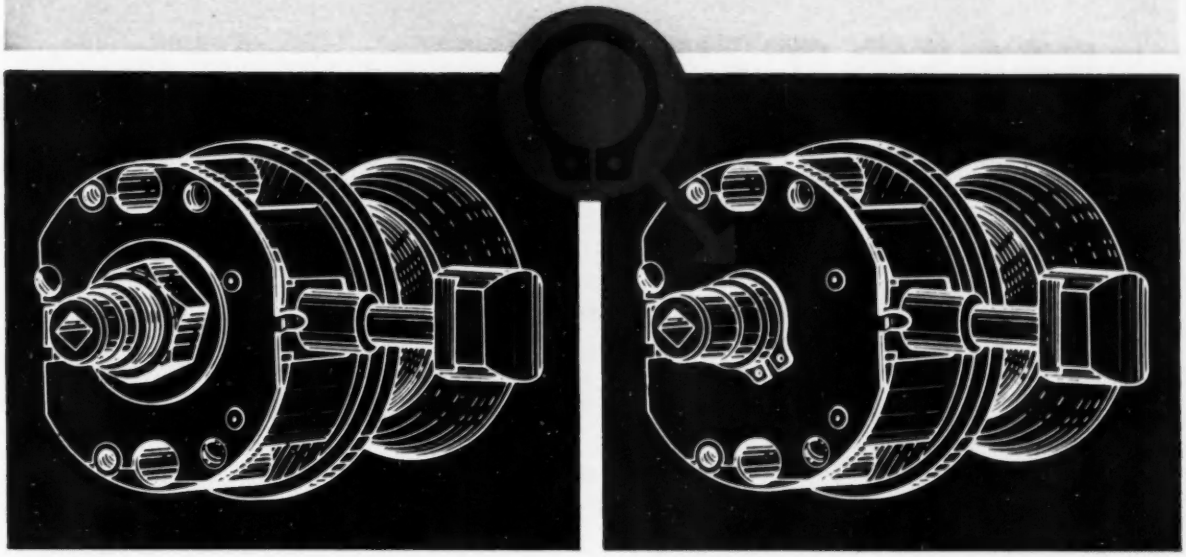
Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

Waldes Truarc Ring Replaces Nut and Washer ...Cuts Costs $5.28 Per M...Speeds Assembly by 50%



OLD WAY. Main shaft required costly threading. Assembly was slowed by the double application of washer and nut and time-consuming tightening operation.

TRUARC WAY. Truarc Retaining Ring snaps quickly and simply over shaft. Lock assembly is secured in one fast operation. Virtually all play is eliminated from lock.

NEW DESIGN USING WALDES TRUARC RING PERMITTED THESE SAVINGS

OLD WAY

Cost of Nut	$10.00	per thousand
Cost of Washer	3.80	" "
Labor for Threading	2.00	" "
Assembly	3.00	" "
TOTAL	$18.80	

TRUARC WAY

Cost of Truarc Ring and Grooving Operation	$11.52	per thousand
Assembly	2.00	" "
TOTAL	$13.52	

J. Chesler and Sons, Inc., Brooklyn, N.Y., manufacturers of the pre-assembled "Reddi-Mount" cylindrical lockset, uses a single Waldes Truarc Retaining Ring instead of an old fashioned nut and washer to secure the entire assembly of their lock. This new, improved fastening method enables Chesler to eliminate costly threading . . . save money on material . . . speed assembly time by 50% and produce an improved, more durable product.

You, too, can save money with Truarc Rings. Wherever you use machined shoulders, bolts, snap rings, cotter pins, there's a Waldes Truarc Retaining Ring designed to do a better, more economical job. Waldes Truarc Rings are precision-engineered . . . quick and easy to assemble and disassemble.

Find out what Waldes Truarc Retaining Rings can do for you. Send your blueprints to Waldes Truarc engineers.

For precision internal grooving and undercutting...Waldes Truarc Grooving Tool

SEND FOR NEW CATALOG

WALDES

TRUARC

REG. U. S. PAT. OFF.

RETAINING RINGS

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK

WALDES TRUARC RETAINING RINGS AND PLIERS ARE PROTECTED BY ONE OR MORE OF THE FOLLOWING U. S. PATENTS: 2,382,947; 2,382,948; 2,416,852; 2,428,341; 2,439,789; 2,441,846; 2,455,165; 2,470,941; 2,483,380; 2,483,383; 2,487,802; 2,497,803; 2,491,306; 2,509,081; AND OTHER PATENTS PENDING.

AY125

Waldes Kohinoor, Inc., 47-16 Austel Pl., L. I. C. 1, N. Y.

Please send me the new Waldes Truarc Retaining Ring catalog.

(Please print)

Name.....

Title.....

Company.....

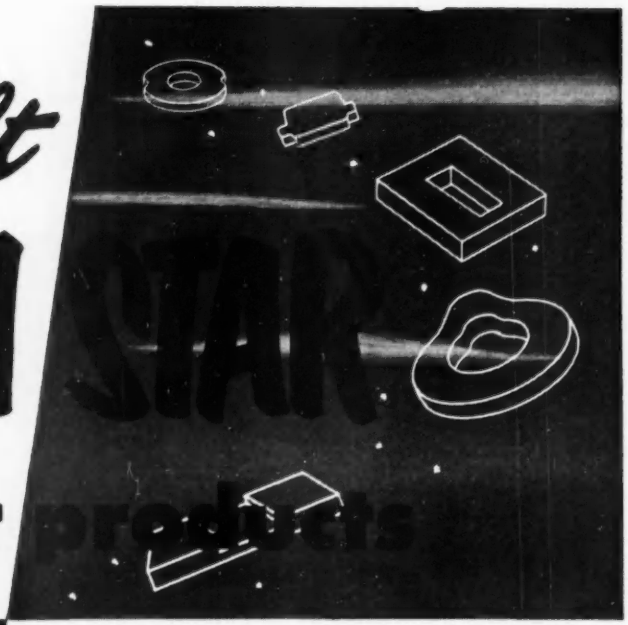
Business Address.....

City..... *Zone*..... *State*.....

western Felt

UNSEEN

of better



Countless products have been improved by the use of WESTERN FELT. There is no substitute for its quality. Its efficiency in absorbing vibration, cushioning loads, providing oil-tight seals, keeping parts dust free, evening temperatures, filtering, lubricating, etc., is the highest obtainable.

Investigate Western Felt. Engineers expert in felt uses will gladly work with you to improve your product or industrial operation.

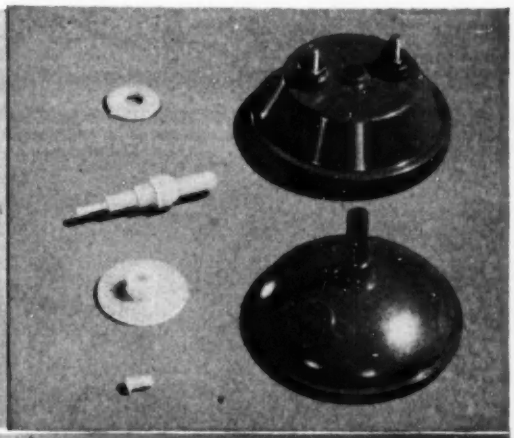
Sheet and roll felt manufactured for special purposes and to meet all S.A.E. and military specifications.

WESTERN Felt WORKS

4035-4117 Ogden Ave.
Chicago 23, Illinois
Branch Offices in Principal Cities

MANUFACTURERS AND CUTTERS OF WOOL FELTS

Parts of Du Pont nylon are strong, can't corrode, need no oiling...



...help automatic starter withstand vibration, give long, trouble-free service

Why not investigate how this unique engineering material—DU PONT NYLON —can help improve your product?

These six parts, as used in a new starter developed for automatic transmission cars, demonstrate how the unique properties of Du Pont nylon can help engineers develop more efficient products.

Du Pont nylon is strong and durable. Parts made of it withstand shock and vibration. Nylon can't corrode, is unaffected by most common chemicals. Du Pont nylon is light in weight, heat-resistant and remarkably resilient. Parts resist wear and abrasion, provide quiet operation with little or no lubrication. And Du Pont nylon's electrical insulating properties insure positive operation.

Perhaps the valuable properties of Du Pont nylon can help you develop a new or improved product or process. For further information on Du Pont nylon write: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Room 1712, Du Pont Bldg., Wilmington 98, Delaware.

Check all these outstanding properties of Du Pont nylon—

- √ **TOUGHNESS**—Nylon is virtually unbreakable, even at low temperatures.
- √ **HEAT RESISTANCE**—Nylon is capable of continuous operation to 250°F.
- √ **ABRASION RESISTANCE**—Nylon resists wear, scuffing and gouging.
- √ **STRENGTH, RESILIENCY**—Nylon absorbs shock without chipping or cracking . . . is strong in thin sections.
- √ **LIGHT WEIGHT**—Nylon's specific gravity is 1.14.
- √ **CHEMICAL RESISTANCE**—Nylon is unaffected by most common chemicals.
- √ **LOW COEFFICIENT OF FRICTION**—Nylon has excellent bearing characteristics—provides quiet operation with little or no lubrication.

Nylon parts molded by United Plastics Industries, Inc., Vassar, Mich., for Automo Corp., Saginaw, Mich.

DU PONT
REG. U.S. PAT. OFF.
NYLON
Plastic
Better Things for Better Living
. . . through Chemistry

FOREMOST IN SCIENTIFIC DEVELOPMENT

IN THE REALM OF FORGING DESIGN AND THE DEVELOPMENT OF PROPER GRAIN-FLOW, WYMAN-GORDON HAS ORIGINATED MANY FORGING DESIGNS WHICH AT THE TIME OF THEIR DEVELOPMENT WERE CONSIDERED IMPOSSIBLE TO PRODUCE BY FORGING.

WYMAN-GORDON

ESTABLISHED 1883

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL

WORCESTER, MASSACHUSETTS

HARVEY, ILLINOIS DETROIT, MICHIGAN

Now! get faster, easier starts...

FOR ANY GAS OR DIESEL ENGINE

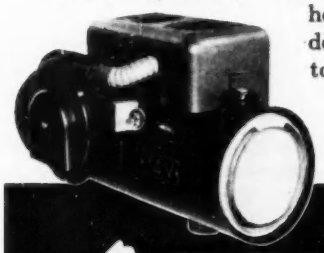
even at 65° below!

WITH South Wind PRE-HEATING SYSTEMS

One heater provides *all 3!*... Engine starting, cab heating —defrosting!

Another Revolutionary South Wind First! With South Wind Pre-Heating Systems you get the same quick, reliable engine starting for any gas or diesel engine that major aircraft and military vehicles enjoy! First choice of engineers and maintenance men, they're designed to make starting easier at all temperatures—*even 65° below!*

Never Before such compactness, such power, such adaptability! *Heater* provides engine preheating, cab heating and defrosting! Economical, too! South Wind Pre-Heating Systems reduce battery drain by reducing starting torque—cut the cost of starting aids. Eliminate the shock loads imposed by brute-force starting methods. Lower maintenance costs—prolong engine life!



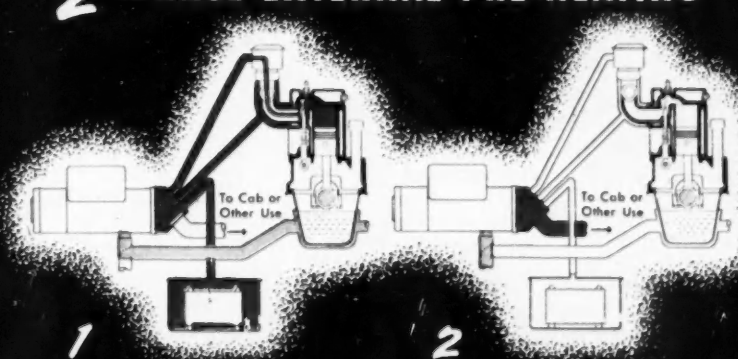
Model 978 MF
20,000 BTU/hr.
fresh air output
Total output, 30,000 BTU/hr.

Clean, Dry Air is delivered to engines by South Wind Heaters! They permit use of optimum viscosity lubricants and assure normal lubrication at all times. Remove moisture—inhibit sludge formation and freeze-up of engine accessories, too.

A Model for Every Requirement! South Wind Heaters meet every *internal* or *external* preheating need. They include units of 20,000, 30,000, 50,000, 60,000, 100,000, 200,000, 600,000, and 700,000 BTU/hr. capacities.

An experienced staff of South Wind Field Engineers is ready to consult with you on any preheating problem. Write today to South Wind Division, Stewart-Warner Corp., Indianapolis 7, Ind.

2-PHASE EXTERNAL PRE-HEATING

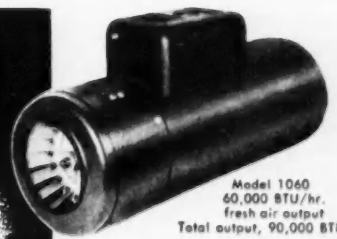


1

Pre-Heat Phase. Clean, *dry* hot air is applied to the exterior surface of the carburetor and intake manifold, and to the battery, by the use of shrouds. The oil sump is heated in like fashion by hot gases from the heater exhaust. (Clean, hot air which enters the air intake is, in some cases, provided for the starting phase.)

2

Operational Phase. After starting engine, clean, hot air from the heater is diverted to cab for personnel heating, defrosting and other uses. (If the application demands, part of this air can be used to provide continuous heat for battery and/or air induction system.) Heater exhaust is diverted directly to atmosphere.



Model 1060
60,000 BTU/hr.
fresh air output
Total output, 90,000 BTU/hr.

Model 1030
30,000 BTU/hr.
fresh air output
Total output,
50,000 BTU/hr.

A PRODUCT OF SW STEWART WARNER

South Wind

PERSONNEL HEATING
ENGINE AND EQUIPMENT PRE-HEATING
WINDSHIELD DEFROSTING

Gas brazing equipment.

Induction brazing unit.

STOP
YOUR CONTACT TROUBLES
BEFORE THEY START

Not One...But Five!

All five types of brazing equipment are available at Mallory to meet your particular needs.

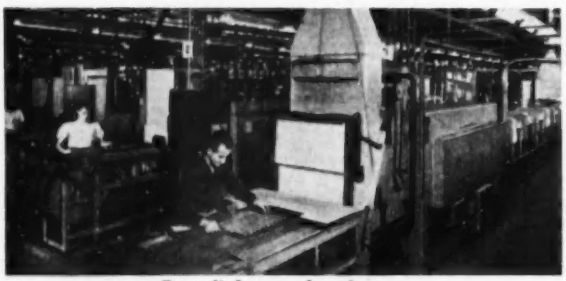
On even the simplest button or rivet contact, trouble can start with the wrong method of bonding. Size, shape, nature of the material, frequency and degree of impact, tooling costs and production quantities . . . all must be considered in selecting the one best method of brazing.

Mallory is equipped to make completely unbiased decisions in selecting the best and most economical brazing technique for any type of contact or contact assembly. Our plant is equipped with all five types of brazing equipment . . . as well as four types of resistance welding equipment. Facilities are available in the laboratory as well as on the production floor. Production techniques are worked out ahead of time . . . before production runs are started . . . so you can be sure of completely dependable contacts, economically produced.

This is only part of the story, however. If you want the rest of it, our engineers will be glad to send you complete information . . . or answer any questions you may have regarding the design and production of the contacts for your products.

Hand brazing with oxy-hydrogen torch.

Resistance brazing machines.



Controlled atmosphere furnaces.

Expect more...
Get more from **MALLORY**

In Canada, made and sold by Johnson Matthey and Mallory, Ltd., 150 Industry Street, Toronto 15, Ontario

Electrical Contacts and Contact Assemblies

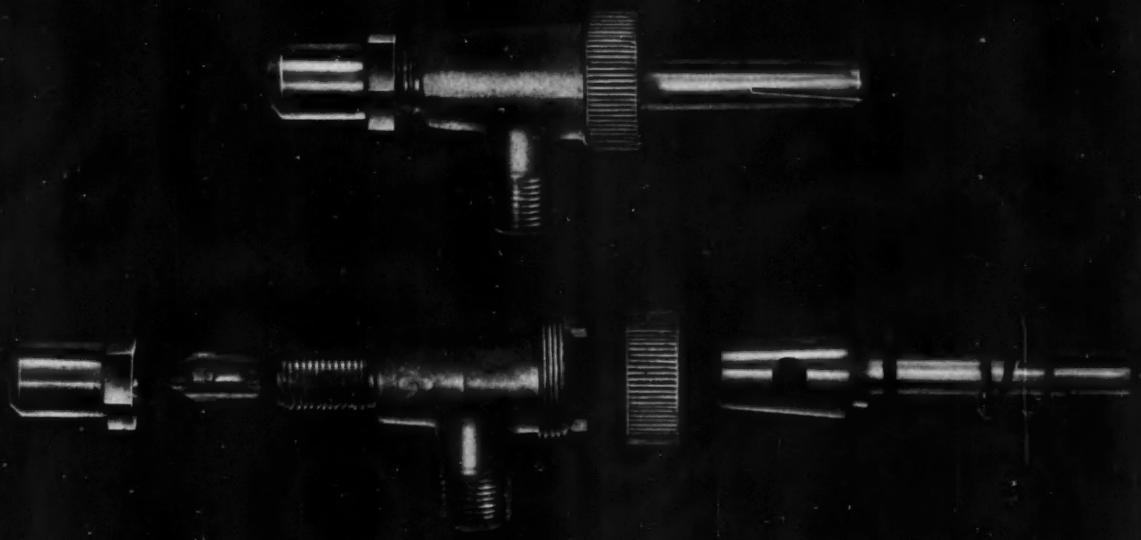
P R MALLORY & CO Inc
MALLORY

SERVING INDUSTRY WITH THESE PRODUCTS:
Electromechanical—Resistors • Switches • Television Tuners • Vibrators
Electrochemical—Capacitors • Rectifiers • Mercury Batteries
Metallurgical—Contacts • Special Metals and Ceramics • Welding Materials

P. R. MALLORY & CO. INC., INDIANAPOLIS 6, INDIANA

LINCOLN FINDS

Brass is Best



Kitchen range burner valve by Lincoln Brass Works, Inc., Detroit 16, Mich. Two different brasses are used in this valve, which is entirely of brass except for the washer and spring. Lincoln also makes valves for heaters and furnaces; flow, drain and shut-off valves for gasoline lines; shut-off valves for agricultural sprayers, and a wide variety of tube and pipe fittings, all entirely or chiefly of free-cutting brass rod and free-machining brass forgings.

Mr. D. E. DuPerow, Vice-President of Lincoln Brass Works, Inc., recently said: "Thirty-six years of brass use by Lincoln and complete acceptance by the trade is the best reason I can think of for brass superiority. If there had been any material better for our purpose, less expensive to fabricate, and more desirable to our customers, we would be using it now."

Brass has many desirable characteristics. Here are five of them that are important in Lincoln valves and fittings: 1, corrosion resistance, which means no plating is required. 2, high speed precision machining for high output, lower costs. 3, sound, non-porous structure of rod and forgings. 4, smooth performance; brass holds lubricants. 5, customer satisfaction; gas range burner valves pass the cycling test of being raised to 425°F. and back to room temperature a minimum of 10,000 times without seizure, loss of free operation, or leakage.

There are many other items besides valves that can profitably make use of the fine qualities of Revere Brass. The Revere Technical Advisory Service will gladly cooperate with manufacturers on the selection of the correct brass and its fabrication. Just call the nearest Revere Sales Office; see your telephone directory. Or write direct.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

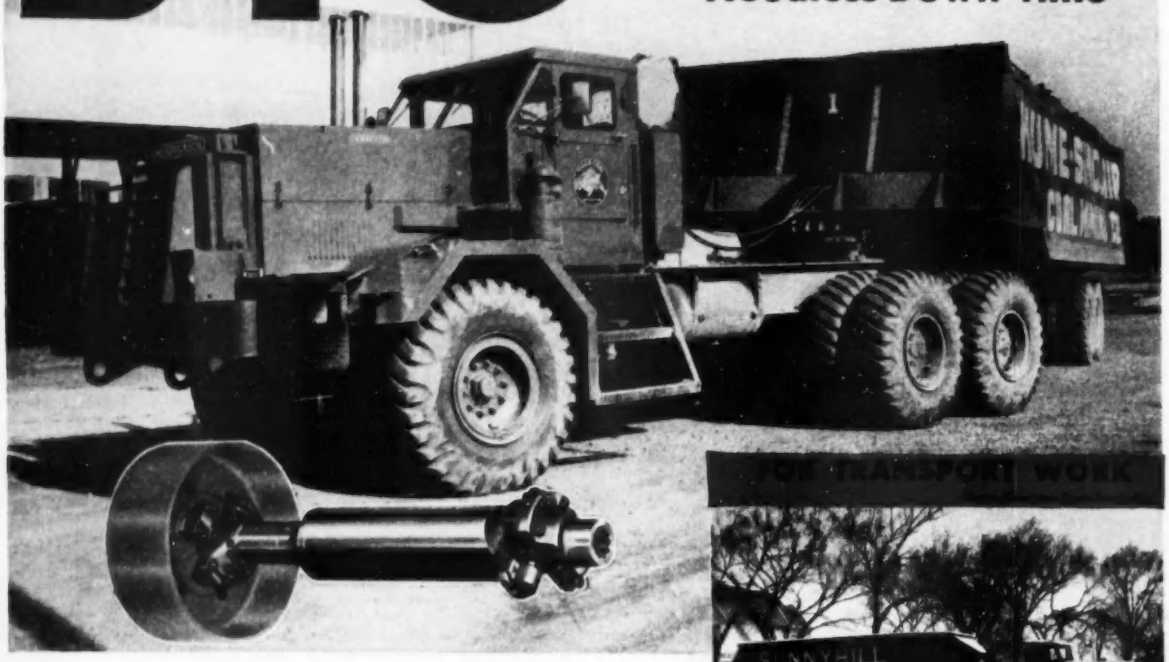
• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.
Sales Offices in Principal Cities, Distributors Everywhere

SEE "MEET THE PRESS" ON NBC TELEVISION, SUNDAYS

BIG

Jobs Can't Afford to Be Kept Idle by Needless Down-Time



FOR TRANSPORT WORK

FOR TRACTOR TOWING

FOR OFF-HIGHWAY JOBS

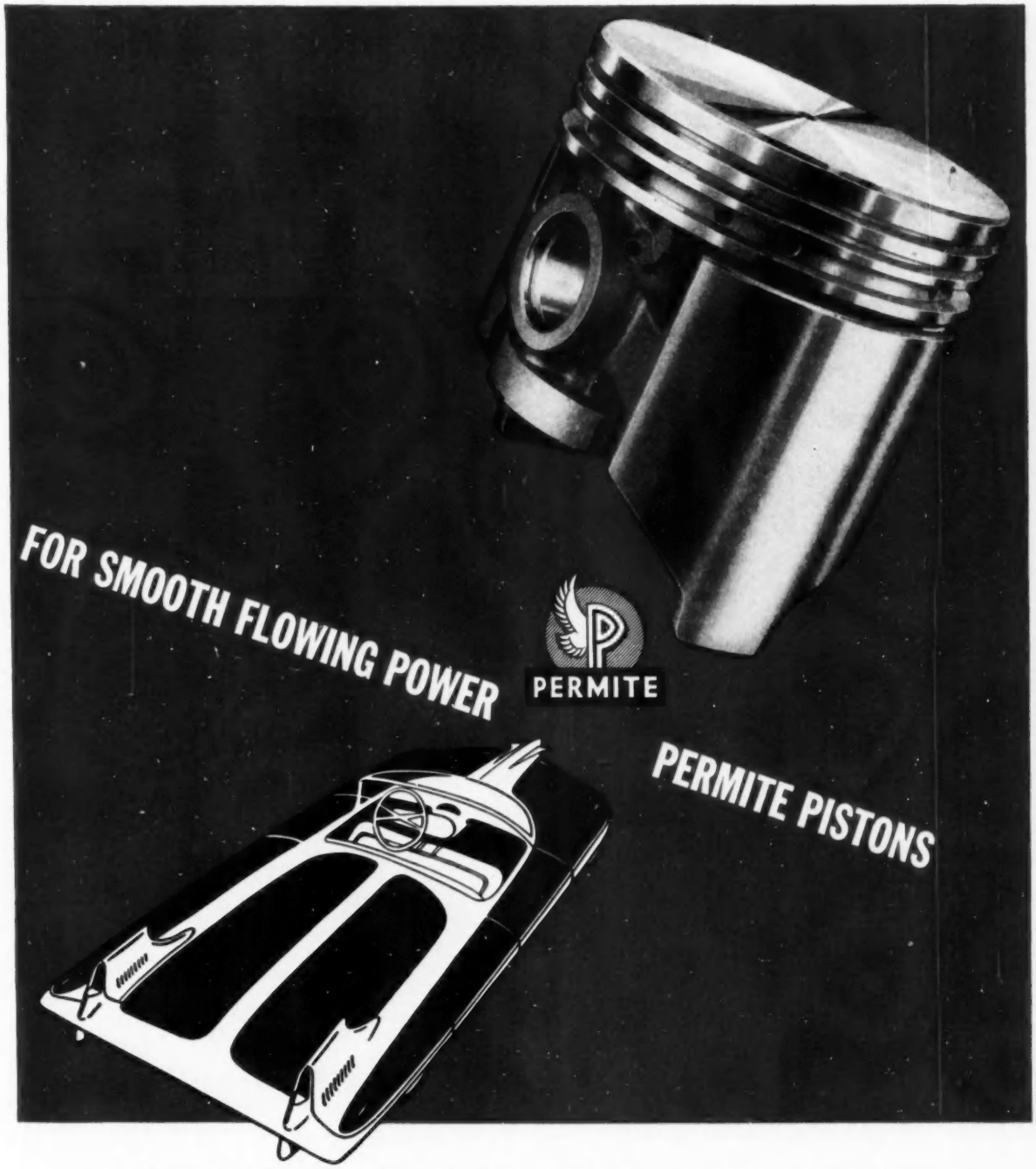
Why Not Give YOUR Truck MECHANICS Advantages?

MECHANICS Roller Bearing **UNIVERSAL JOINTS** will give *your trucks more road time and less shop time* because **MECHANICS JOINTS** are specially designed with less parts and connections — for easy assembly and servicing — smooth running balance — maximum strength with less weight — and long, trouble-free, safe operation. Either the joints or brake drum can be serviced independently without disturbing other attachments or altering original drum or propeller shaft balance. Let MECHANICS engineers give *your trucks or other heavy-duty machines these competitive advantages.*

MECHANICS
UNIVERSAL JOINT
DIVISION
Borg-Warner
2024 Harrison Ave.
Rockford, Ill.

MECHANICS
Roller Bearing BW
UNIVERSAL JOINTS

For Cars • Trucks • Tractors • Farm Implements • Road Machinery • Aircraft • Tanks • Busses and Industrial Equipment



Since the early days of the industry, Permite engineers have cooperated closely with automotive engineers in piston design and development for better engine performance.

Today's powerful, smooth-running engines give testimony to the fact that progress never stops in the automotive industry, or with those suppliers who contribute to its high requirements.

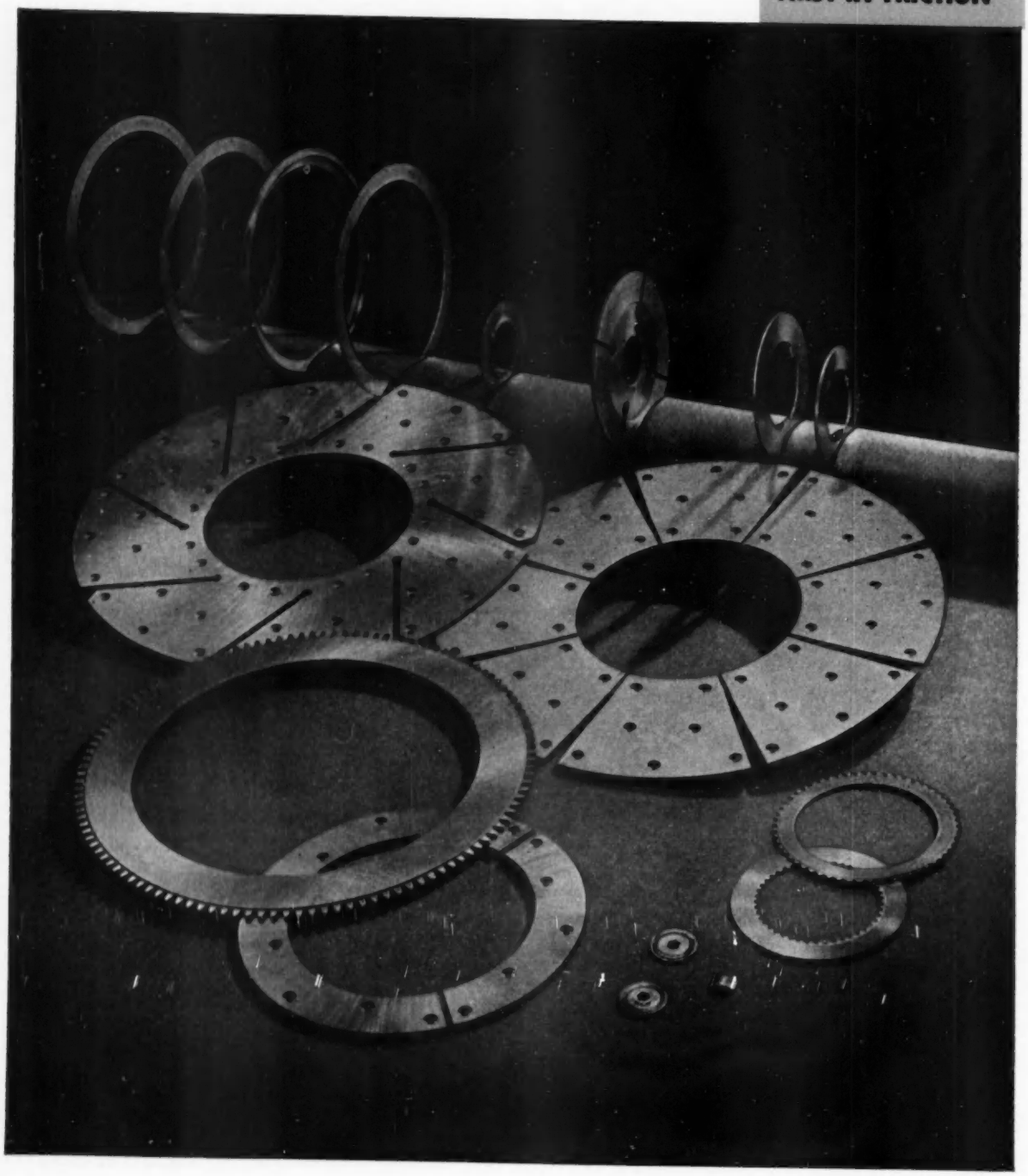
As a dependable source of supply for pistons, valves and other engine parts to meet today's high standards, Permite's long experience and complete facilities are at your service.

ALUMINUM INDUSTRIES, Inc. . . . Cincinnati 25, Ohio

Detroit: 809 New Center Building
New York: 9 Rockefeller Plaza
Chicago: 64 E. Jackson Boulevard

ALUMINUM PERMANENT MOLD AND SAND CASTINGS . . . HARDENED, GROUND AND FORGED STEEL PARTS

RM
FIRST IN FRICTION

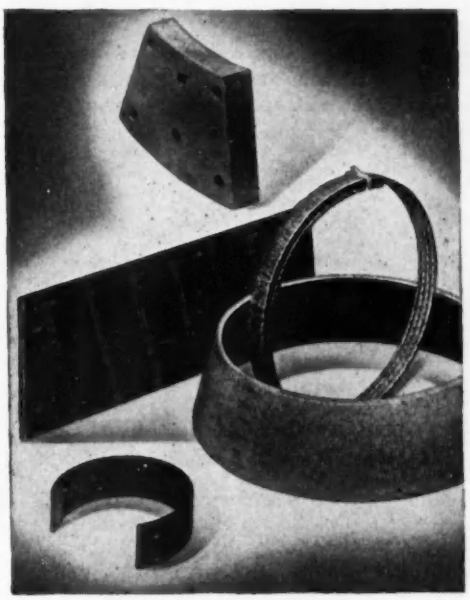


More and more special friction problems are being solved by

R/M SINTERED METAL PRODUCTS

Ever since sintered metal entered the picture as a friction material, Raybestos-Manhattan's research and development facilities have been busy. All of R/M's know-how and experience have been utilized in developing sintered metal products for specialized applications in the automotive, aviation and earth-moving industries. It is exceptionally suitable for applications requiring close tolerances, or for operating conditions such as immersion in oil.

Perhaps you have a friction material problem that sintered metal could solve. You can find out by talking to your R/M representative. Behind him are the advantages offered by the world's largest maker of friction materials . . . seven great plants, their research departments, their testing laboratories.



R/M's complete line of friction materials includes *woven and molded asbestos parts in the form of blocks, segments, discs, cones, collars, and many special shapes.*

Write for our engineering bulletin outlining recent developments in friction materials for brake linings, clutch facings, and special shapes and sizes.

RAYBESTOS-MANHATTAN, INC.

EQUIPMENT SALES DIVISION 6010 Northwest Highway, Chicago 31, Ill.

Detroit 2 Cleveland 14 Los Angeles 58

Factories: **Bridgeport, Conn. Manheim, Pa. Passaic, N.J. No. Charleston, S.C.**

Crawfordsville, Ind. Neenah, Wis. Canadian Raybestos Co. Ltd., Peterborough, Ont.

RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings Fan Belts • Radiator Hose • Industrial Rubber Products • Rubber Covered Equipment • Packings • Teflon Products • Asbestos Textiles • Sintered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

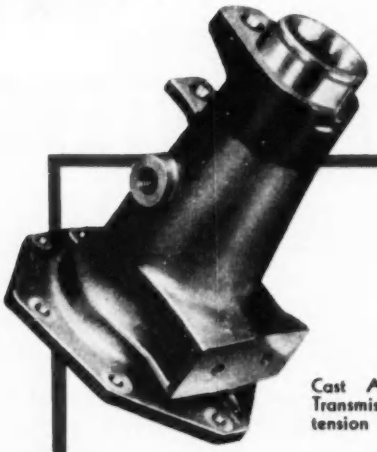
R/M

FIRST IN FRICTION

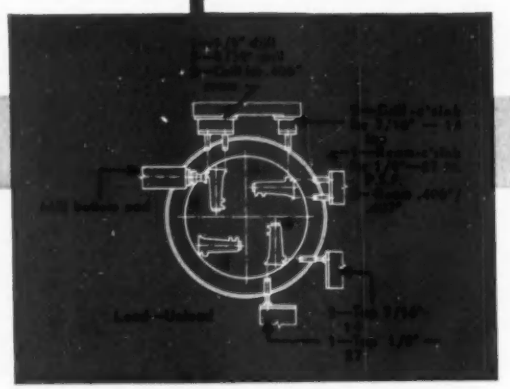
118 *Pieces per hour* 35 *Operations...*

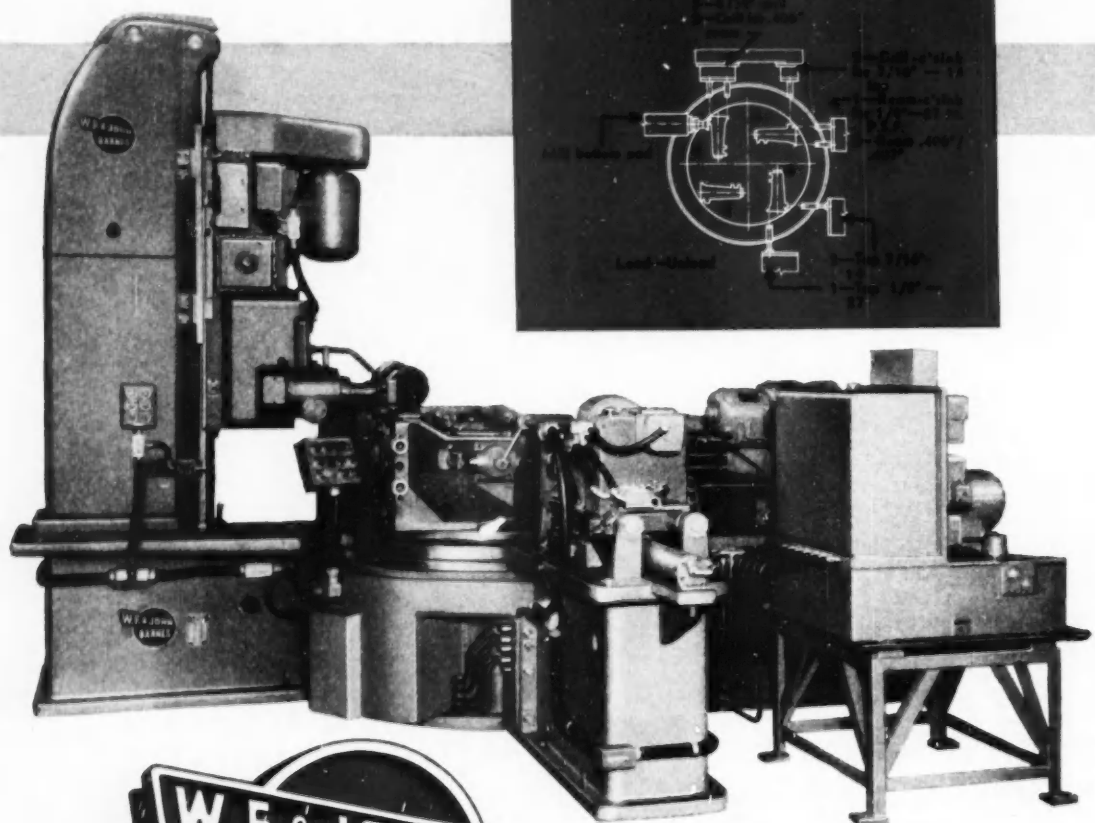
TRANSMISSION EXTENSIONS MACHINED TO CLOSE TOLERANCES ON COMPANION UNITS

Here is another typical example of how W. F. & John Barnes coordinated special machine engineering and building service helps solve complex machining problems. These two companion units, designed to machine cast aluminum automobile transmission extension housings, reduce production costs by combining operations. Note how the parts are positioned and the tooling arranged for efficient machining, and how the over-all design conserves floor space. The two machines perform 35 operations at the required gross production rate of 118 pieces per hour. Whether your production requires large or small machines, you'll find the coordinated services at Barnes can help you solve problems quickly and efficiently.



Cast Aluminum Transmission Extension Housing





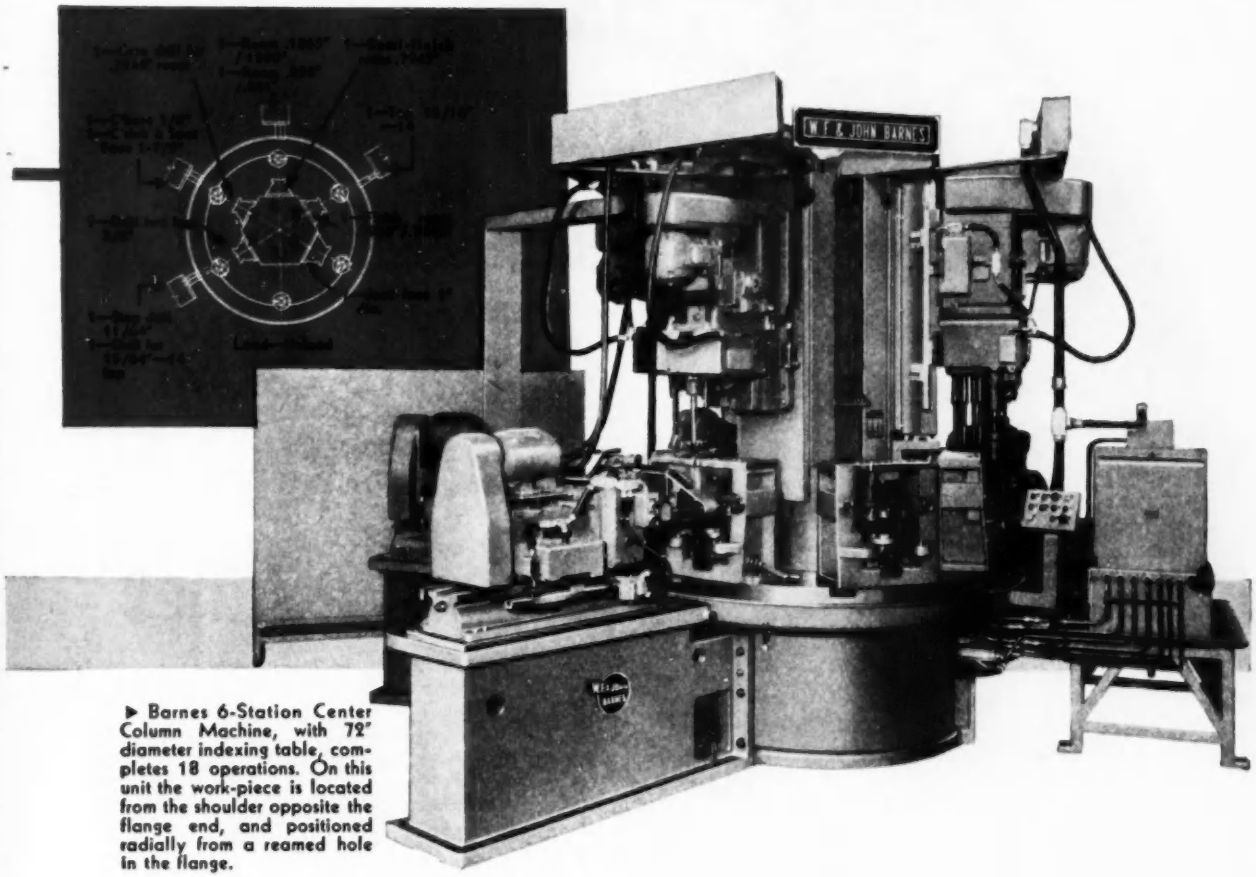
Barnes 4-Station Special Machine with 48" diameter hydraulically operated rotating table. This unit performs 17 operations. Vertical milling of bottom pad in Station No. 2 is completed with a retracting spindle. Fixtures locate part on end bores.

W. F. & JOHN BARNES

W. F. & JOHN BARNES COMPANY

MULTIPLE SPINDLE DRILLING • BORING • TAPPING MACHINES

. . . ON W. F. & JOHN BARNES SPECIAL MACHINES



▶ Barnes 6-Station Center Column Machine, with 72" diameter indexing table, completes 18 operations. On this unit the work-piece is located from the shoulder opposite the flange end, and positioned radially from a reamed hole in the flange.

BARNES SPECIAL MACHINE TOOL BUILDING SERVICE INCLUDES

1 **SPECIALIZED MANUFACTURING FACILITIES**—75-year background, large well equipped plant efficiently tooled to produce high production machines.

2 **SPECIAL HYDRAULIC EQUIPMENT**—designed and built to meet JIC standards. Individually engineered units assure smooth, dependable actuation for every requirement.

3 **SPECIAL ELECTRICAL EQUIPMENT and CONTROLS** — individually designed and built for maximum safety and ease of control with circuits that assure the most dependable coordination of all machine functions.

4 **SPECIAL GAUGES, FIXTURES, TOOLS** — designed for each individual machining problem, assure accuracy of operations at high production speeds.

5 **SPECIAL HANDLING AND CONVEYOR EQUIPMENT** — designed and built to reduce work handling, effect maximum safety and efficiency.

6 **COORDINATED DESIGN AND ENGINEERING** Mechanical, Hydraulic, Electrical, Process, Tool, and Fixture Engineers work together at Barnes. Team-work solves complex problems quickly.

Write **FOR FREE DATA**

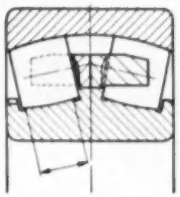
"Coordinated Machine Engineering" — a free booklet describing modern machines and mass production techniques. Write for your copy today.

312 S. WATER ST., ROCKFORD, ILLINOIS

AUTOMATIC PROGRESS-THRU AND TRANSFER TYPE MACHINES

the SKF improvement of internal design of spherical roller bearings

Increases capacity 25% to 50% increases service life 2 to 3½ times

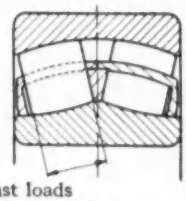


This is the Spherical Roller Bearing design originated by SKF *more than 30 years ago.* The cross-section shows how the integral inner ring flanges, and the undercuts adjacent thereto, limit the effective length of the rollers.

Now, SKF, originator of the Spherical Roller Bearing, has again provided industry with another anti-friction *first.*

This time, it's a revolutionary design advance in Series 222 and 223 bearings providing these advantages:

When designing new equipment, you can obtain the desired life by using smaller or lighter bearings at considerable cost saving. In addition, this forward step in design will carry heavier combinations of radial and thrust loads, or pure thrust loads of greater magnitude. The important self-aligning feature of SKF Spherical Roller Bearings has been preserved, so that considerable misalignment between the shaft and housing has no ill effect whatever on bearing capacity or life.



Here is the latest SKF improvement, a *revolutionary advance in design.* Effective roller guiding is accomplished by means of a separate ring. The need for undercuts is eliminated! This type of guide ring permits the rollers to take the position which their contact with the rings dictates. This assures uniform load distribution over the entire length of the longer rollers at all times. *Result*—greatly increased capacity and life.

During more than 4 years, thousands of installations have been made in railroad journals, vibrating screens, steel mill machinery and numerous other fields. In all cases performance has been outstanding.

SKF Sales Engineers in our District Offices throughout the country will assist you in making use of the important advantages of the improved internal design of SKF Spherical Roller Bearings. **SKF INDUSTRIES, INC.,** Dept. 616, PHILADELPHIA 32, PA.
— *manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.*

7424

SKF®
BALL AND ROLLER BEARINGS

This 12-page booklet gives you additional facts—sizes available—added capacity, size by size—increased life you can expect for each size—dimensional tabulations—and load and speed data. Write now for your free copy of Booklet No. 365-2.

© 1953, SKF INDUSTRIES, INC.,

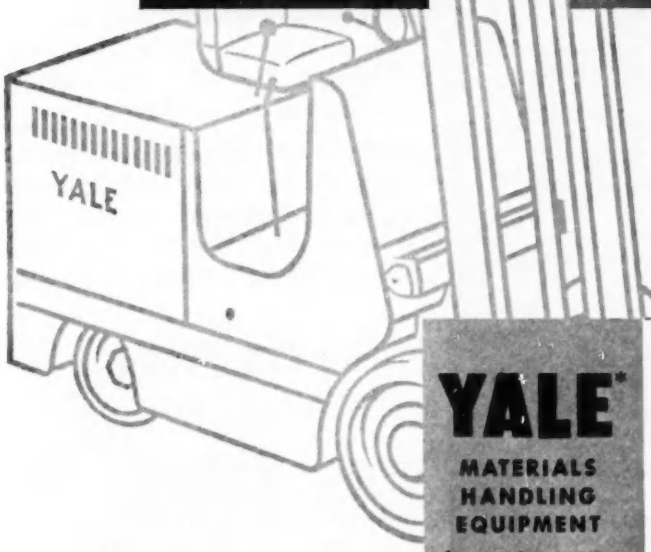
Lower production costs with YALE ELECTRIC TRUCKS

...and the YALE attachments designed for your industry

Crate clamp attachment also available with sideshifter.

Pusher attachment for automatic positioning of loads.

Paper roll clamp attachment rotates through a full 360°.



The rugged structure of every YALE Electric Truck is designed to house the most efficient power plant available...to insure more than ample capacity for your particular lifting, moving and stacking jobs. The trouble-free YALE hydraulic system provides sure, steady power for safer, smoother lifting and lowering. Yet, with all these advantages...with power and stamina to spare...YALE Electric Trucks are economical to own, operate and maintain...amazingly versatile for every materials handling problem.

YALE*
MATERIALS HANDLING EQUIPMENT
*Reg. in U. S. Patent Office

MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. 712
Roosevelt Blvd. & Haldeman Ave., Phila. 15, Pa.

☐ Please send me the *Picture Story of Yale Materials Handling Equipment*

☐ Please have local YALE Representative call

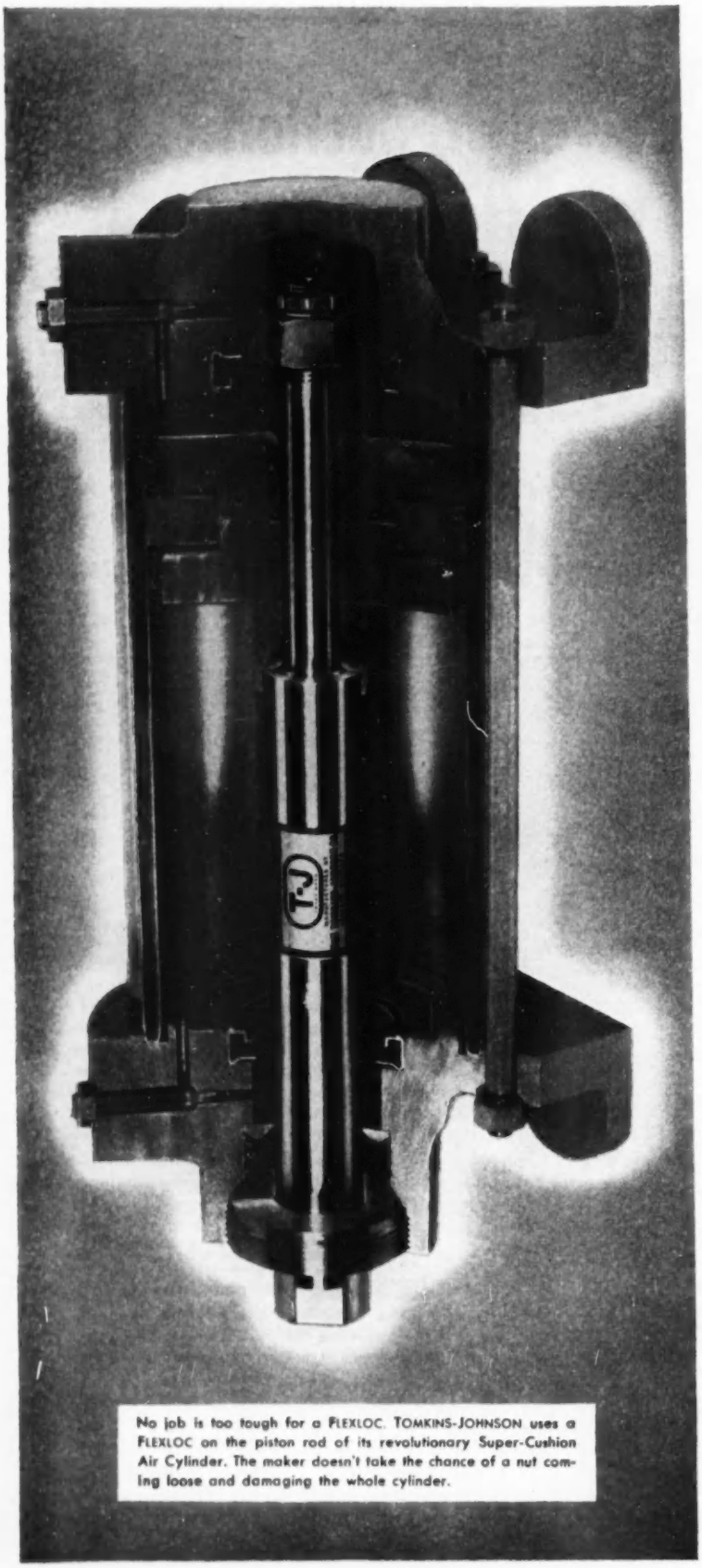
Company_____

Name_____ Title_____

Street_____ City_____ State_____

In Canada write: The Yale & Towne Manufacturing Company
St. Catharines, Ontario, Canada

Gas, Electric, Diesel & LP-Gas Industrial Trucks • *Worksavers* • Hand Trucks • Hand & Electric Hoists • Pul-Lifts



No job is too tough for a FLEXLOC. TOMKINS-JOHNSON uses a FLEXLOC on the piston rod of its revolutionary Super-Cushion Air Cylinder. The maker doesn't take the chance of a nut coming loose and damaging the whole cylinder.

What FLEXLOC locknuts do for you

FLEXLOCS eliminate complicated, time-consuming methods of locking threaded fasteners. They offer simpler, faster application and safer, more dependable locking than plain nuts and lockwashers, castellated nuts and cotter pins, or nuts and jam nuts. And they won't work loose.

The reasons for all this are plain. FLEXLOCS are one piece—nothing to assemble, come apart, lose or forget. FLEXLOCS are all metal—have higher tensile than most other locknuts and are not affected by temperatures to 550°F. FLEXLOCS are both stop and locknuts—don't have to seat to lock, and stay put anywhere on a threaded member as soon as their locking threads are fully engaged.

SPS can deliver any quantity of FLEXLOCS in a wide range of sizes. Stocks are carried by industrial distributors everywhere. Write for literature. SPS, Jenkintown 53, Pa.

FLEXLOC

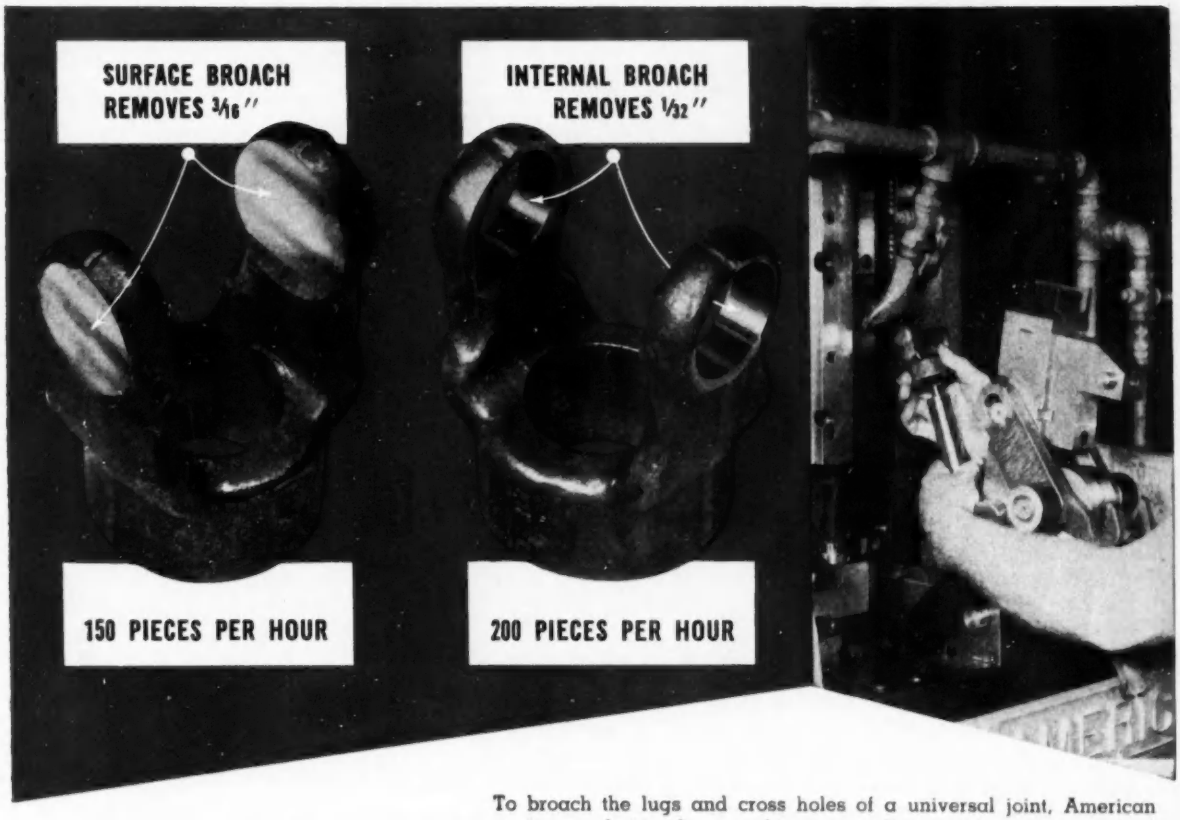
LOCKNUT DIVISION

SPS

JENKINTOWN PENNSYLVANIA

Our Fiftieth Year : A START FOR THE FUTURE

one American broaching machine



surface and internal broaching possible with American 3-way machine

To broach the lugs and cross holes of a universal joint, American engineers designed a combination tooling set-up on a standard American T-10-36 3-way machine.

Arranged with 3 stations, the machine surface broaches 3/16 stock off the inside and outside surfaces of the lugs at the center station; or broaches 1/32 off the I. D. of the lug cross holes at the two outer stations. The versatility of the American 3-way machine allows for a permanent tooling set-up, to handle both operations.

Such assistance in planning and setting up your broaching operation is part and parcel of the American Way of broach engineering. It is a typical example of the complete service you get from American Broach . . the organization that makes all three . . . broaches, machines, and fixtures.

For more information on your particular broaching problem send a part-print or sample and hourly requirements. Address Dept. I.

For more information on American Machines send for Catalog #300.

AMERICAN **American BROACH & MACHINE CO.**

A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

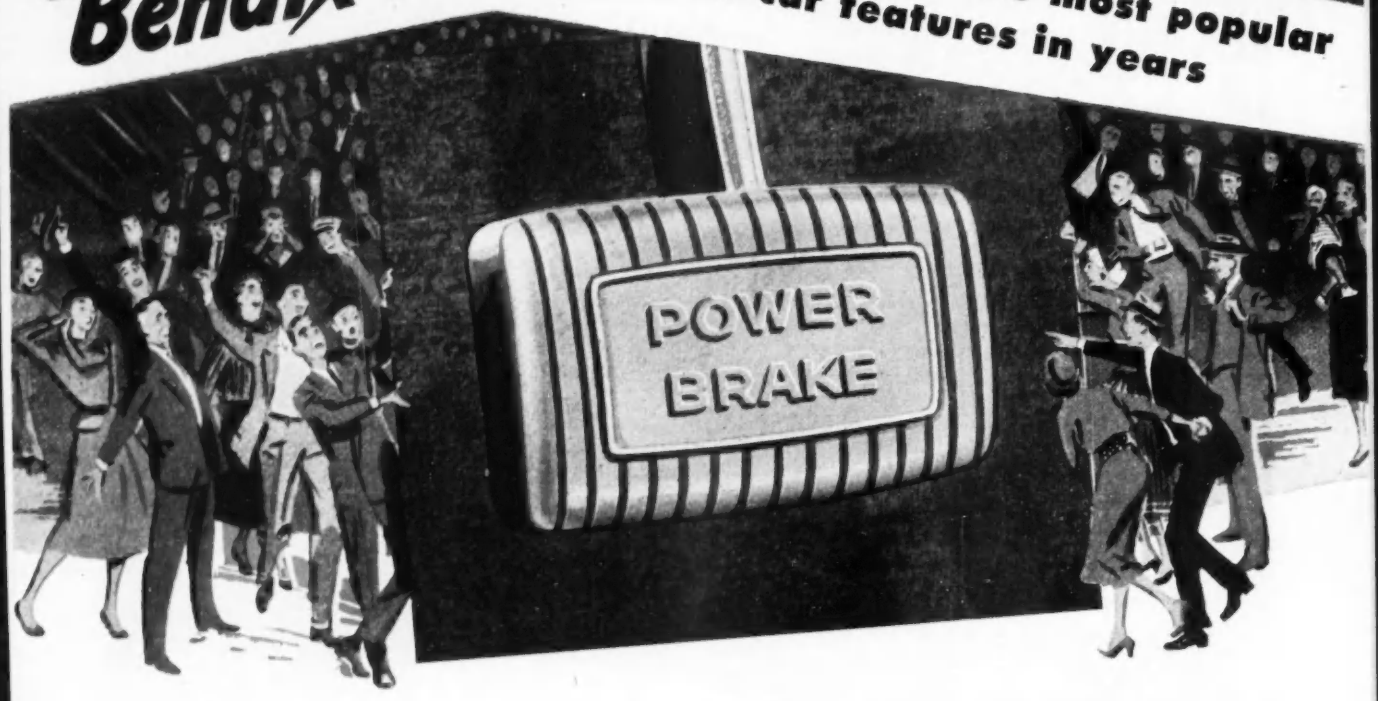
American Building - Ann Arbor, Michigan

SUNDSTRAND

See American First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

Bendix Low Pedal Power Brake

one of the most popular new car features in years



Specified by More Car Manufacturers Than Any Other Make

Since the earliest days of the industry, car manufacturers have entered each model year with a host of new improvements that represent added value for the motoring public.

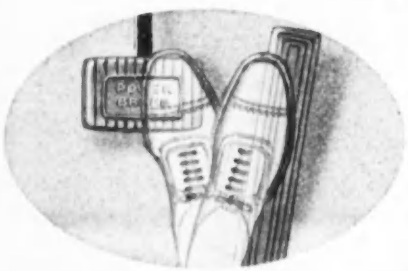
While all of these advancements have contributed to greater motoring enjoyment, the "new car features" that have basically altered previous motor car standards of performance are relatively few in number. For example, four-wheel brakes, a Bendix development, brought new safety to the highways; automatic transmissions materially increased driving ease; and today another great new feature, Bendix* Low Pedal Power Brake, is recognized as a revolutionary advancement in motor car control.

It is the only low pedal power brake that has met the test of millions of miles. In fact, Bendix Low Pedal Power Brake is specified by more manufacturers than any other make. It is the product of Bendix—world's largest producer of power brakes and leader in braking developments since the earliest days of the industry.

To make your line more popular it pays to equip with the performance proven Bendix Low Pedal Power Brake.

*REG. U.S. PAT. OFF.

NOW *Stopping* IS AS EASY AS *accelerating*



It is no longer necessary to lift the foot and exert leg power pressure to bring your car to a stop. With the Bendix Low Pedal Power Brake on about the same level as the accelerator, an easy ankle movement, much like working the accelerator, is all the physical effort required for braking. And by merely pivoting the foot on the heel, shifts from "go" to "stop" controls are made in far less time.

Result: MORE DRIVING COMFORT, LESS FATIGUE AND GREATER SAFETY

Bendix Products Division

BENDIX PRODUCTS DIVISION SOUTH BEND

Bendix
AVIATION CORPORATION

MOST TRUSTED NAME IN BRAKING

Export Sales: Bendix International Division, 205 East 42nd St., New York 17, N. Y. • Canadian Sales: Bendix-Eclipse of Canada, Ltd., Windsor, Ontario, Canada

AUTOMOTIVE INDUSTRIES

BUSINESS DEPARTMENT

G. C. Buzby, President and Manager
Automotive Division
E. H. Miller, Advertising Mgr.
E. W. Hevner, Circulation Mgr.
John Pfeffer, Promotion Mgr.
Charles W. Hevner, Research Mgr.

REGIONAL MANAGERS

CHICAGO—John T. Hoole
916 London Guarantee
and Accident Building
Chicago 1, Ill.

DETROIT—E. E. Elder
1015 Stephenson Bldg.
Detroit 2, Mich.

PHILADELPHIA and NEW YORK—
Nelson W. Sieber
Chestnut and 56th Sts.
Philadelphia 39, Pa.
and
100 East 42nd St.
New York 17, N. Y.

CLEVELAND—Jack C. Hildreth
1030 National City Bank Bldg.
Cleveland 14, Ohio

SAN FRANCISCO—
R. J. Birch and Frank W. McKenzie
300 Montgomery St.
San Francisco 4, Calif.

LOS ANGELES—L. H. Jackson
3156 Wilshire Blvd.
Los Angeles 5, Calif.

One of the Publications
Owned by
CHILTON CO. (INC.)
Executive Offices
Chestnut & 56th Sts.
Philadelphia 39, Pa., U.S.A.

Officers and Directors
President
JOSEPH S. HILDRETH

Vice Presidents
EVERIT B. TERHUNE
G. C. BUZBY
P. M. FAHRENDORF
HARRY V. DUFFY
Treasurer—WILLIAM H. VALLAR
Secretary—JOHN BLAIR MOFFETT
GEORGE T. HOOK
TOM C. CAMPBELL
MAURICE E. COX
FRANK P. TIGHE
L. V. ROWLANDS
ROBERT E. McKENNA
IRVING E. HAND

High Spots of This Issue

★ Wright Engines Built on Automatic Assembly Lines

Automation, an indispensable technique in vehicle manufacture, has now been adapted to aircraft engine production at Curtiss-Wright's Wood Ridge, N. J., plant. Conveyors, pallets, automatic machines, and space-saving devices abound. Page 52.

★ Studebaker Introduces New Brakes for 1954

Primary center of interest from a mechanical point of view in the new Studebaker line is found in a new self-energizing and self-centering brake system. A second noteworthy feature is three automatic ratios in drive range. Page 56.

★ Novel Jet Engine Is Designed for Production

At last the Defense Dept. has seen fit to permit the shrouds of secrecy surrounding the Fairchild J-44 turbojet to be raised. It is revealed to have a monocoque sheet metal construction with outer cowl supporting structure. Page 58.

★ Numerous Sports Models at London Motor Show

Although it followed closely on the heels of the recent Paris Salon, the Earls Court Show in London attracted a great deal of interest. Sharing the spotlight with the wide variety of sports cars were new small automobiles. Page 62.

★ Highlights of Three SAE Meetings

Chicago was a beehive of activity recently for the SAE with sessions on Transportation, Diesel Engines, and Fuels and Lubricants. Major points brought out at the gatherings and abstracts of some papers are presented here. Page 70.

★ 34 New Product Items, And Other High Spots, Such As:

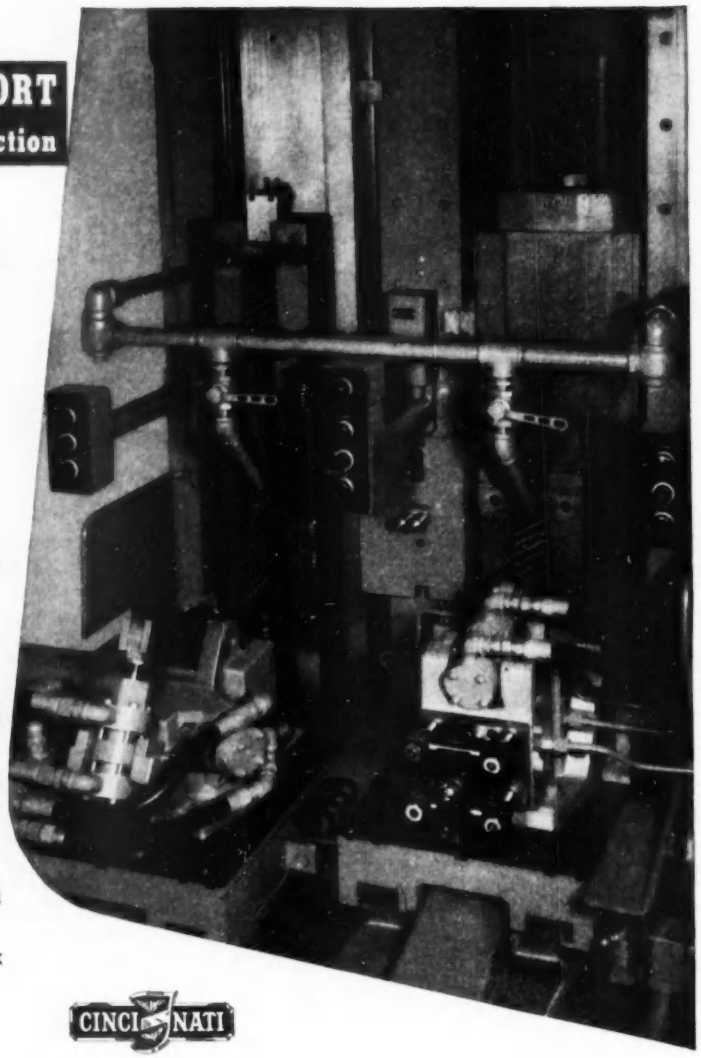
Body engineers technical convention; Lincoln 1954 improvements; Chevrolet trucks; new FWD trucks; new Nash Rambler; new GMC trucks; aircraft hydraulic problems; and Piper's new plane.

Automotive and Aviation News, Page 33
Complete Table of Contents, Page 3

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES • BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY • PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT
ENGINEERING • PRODUCTION • MANAGEMENT

REDUCING PHYSICAL EFFORT
and maintaining high hourly production

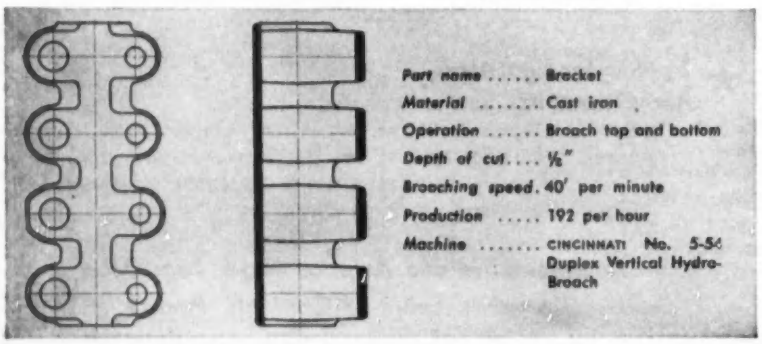
A steady flow of production throughout the day is desirable in any plant. The best way to attain this result is with labor-aiding equipment that reduces or virtually eliminates fatigue. How this was accomplished in broaching cast iron brackets is illustrated here. ¶Cincinnati Application Engineers tooled up a new CINCINNATI No. 5-54 Duplex Vertical Hydro-Broach with two hydraulically operated fixtures. The operator merely positions and removes the work; the fixtures automatically clamp and unclamp in sequence with the advance and retraction of the tables. Of course, the machine contributes a big share toward consistent uniform production. Lubrication of ways and other bearings is automatic, with a measured volume of oil under pressure. Ways are hardened and ground. Hydraulic lines are exceptionally short, promoting smooth cutting. Pre-set cycle control safeguards the operator. ¶Our Application Engineers will be glad to give you their experience in tooling up high priority work for low-cost, uniform production on CINCINNATI Hydro-Broach Machines. If you're not familiar with these efficient production machines, write for literature.



CINCINNATI

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

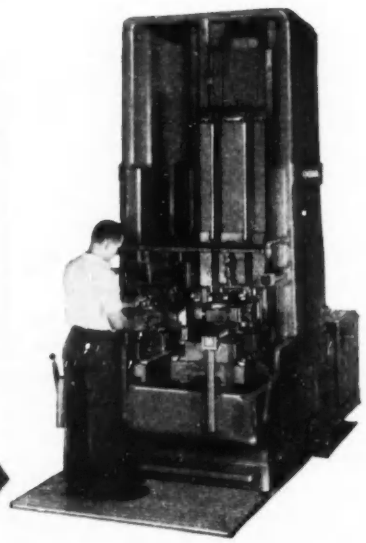
Drawing of part broached on the All-Cincinnati equipment illustrated here. Heavy lines indicate broached surfaces.



Part name ..... Bracket
Material ..... Cast iron
Operation ..... Broach top and bottom
Depth of cut .... ⅛"
Broaching speed . 40' per minute
Production ..... 192 per hour
Machine ..... CINCINNATI No. 5-54 Duplex Vertical Hydro-Broach

CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES
BROACHING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID



CINCINNATI No. 10-66 Duplex Vertical Hydro-Broach. Complete specifications in catalog No. M-1709-1.

News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 109, No. 11 **December 1, 1953**

GM to Float Huge Debenture Issue

The effects of excess profits taxes, high cost of capital expenditures for expansion without an increase in depreciation allowances, and heavier working capital requirements are indicated in a huge borrowing program approved by General Motors directors.

General Motors will issue $300 million of 25-year debentures, the largest industrial financing issue ever offered to the public, about Dec. 9 and the money will be used in part to finance GM's continuing program of capital expenditures and in part for working capital.

During the past four years GM has spent $1¼ billion on capital expenditures, approximately $700 million more than depreciation charges allowed during that time. Need for working capital also has increased because of much larger sales volume, including substantial sales of defense goods.

The financing is the first since GM sold $100 million worth of $3.75 preferred stock in November, 1946. Currently, the corporation has no funded debt outstanding.

Ford Assets Increased $173 Million in 1952

Ford Motor Co. recently reported that its assets rose $173 million in 1952 to $1,757,750,387 on Dec 31. The company surplus in the balance sheet, as of that date, was $811 million, $88 million more than at the end of 1951.

These figures would seem to indicate that Ford earned a good profit last year, in addition to the dividends it paid. The amounts of these are not revealed under company policy.

Proof that Ford put a fair proportion of the profits back into the business would seem to be found in the sizable cash item appearing on the balance sheet. It was $540 million, $6 million more than in 1951. Value of property, plant, and equipment rose to $801.234 million from $712.984 million the preceding year.

RUSSIAN CRAWLER AT WORK

Shown here is a Russian DT-54 crawler fitted with broad tracks for compressing and forming peat briquettes on the bog surface. The four-cyl Diesel engine is rated at 54 bhp at 1300 rpm. The transmission has five forward speeds.

Hudson Adds Utility Car to its 1954 Model Line

Latest addition to Hudson's 1954 line of cars is the Jet Utility Sedan. It is said to combine the features of an economical, six-passenger family car that can easily be converted to a carry-all for sports, farm, or business use.

Converting the car is accomplished by removing two bolts at the bottom of the rear seat back. With back seat removed, the hinged trunk divider wall falls forward to provide a flat carrying surface extending from the trunk through the rear seat area.

The new model is powered by a six-cyl, 114-hp (max) engine. Wheelbase is 105 in., and factory list price is $1665 for the automobile.

Fairchild Planning Twin-Jet Transport

Fairchild Engine & Airplane Corp. disclosed recently that it is contemplating building a commercial jet transport, if airline demand warrants it. The company is also interested in designing and selling a military version.

The plane reportedly would be powered by two Wright J-67 jet engines which would enable it to cruise at a speed of 570 mph. If the company is able to go ahead on the project, first deliveries of the plane could be probably made in 1958.

Clark Equipment Plans Equipment Leasing

Clark Equipment Co. is setting up a new program for leasing its industrial material handling equipment. The program will operate through the company's dealers on a nationwide basis, according to present plans.

News of the AUTOMOTIVE

Chrysler Expresses Intent to Capture Greater Percentage of Vehicle Market; More Stress Seen Laid on Styling and Harmonizing of Color Inside and Out

The name given to Chrysler Corp.'s recent annual press show in Detroit was an extremely significant and appropriate one. Called "Harmony on Wheels," the wealth of exhibits from the company's complete line of 1954 passenger cars and trucks through an impressive display of colorful and long-wearing automotive fabrics emphasized one central theme—the increasing stress which Chrysler is laying on styling and the effective use of color in harmonizing both interiors and exteriors.

In days gone by, Chrysler laid most of its sales emphasis on the mechanical features of its vehicles. A few years ago, however, Chrysler, along with other manufacturers, came to appreciate more and more the overwhelming importance also of modernistic, functional styling and tasteful use of complementary colors in passenger car design. The steady trend in this direction culminated in the brilliant kaleidoscope of body styles and colors available, for 1954.

The future portends an increasing use of color harmonizing with the growing influence of women in the purchase of automobiles, the steady improvement in paint durability with the addition of titanium and cadmium, and the development of fabrics which can be woven into an infinite variety of patterns with strong wearing qualities. It was apparent also from the bright shades in which some of the trucks on display were painted that they also will increasingly incorporate esthetic as well as functional design and styling.

Sports Cars

A great deal of interest at the show centered around the recently announced Dodge Firearrow (see AUTOMOTIVE INDUSTRIES, Nov. 15, p. 21) and the De Soto Adventurer (see AUTOMOTIVE INDUSTRIES, Nov. 15, p. 23). Designed by Chrysler in Detroit and hand-crafted by Ghia of Italy, both cars incorporate a number of interesting styling ideas.

When quizzed at a press conference held during the show as to any plans for producing these cars in volume, L. L. Colbert, president of Chrysler Corp., stated that Chrysler was not convinced that a market sufficient to support any sort of mass production of such cars existed as yet, in spite of the fact that Chevrolet plans to build 10,000 Corvettes, while Ford reportedly will turn out 15,000 sports cars in 1955. He did say, however, that Chrysler would be willing to turn out a few for interested parties willing to pay high.

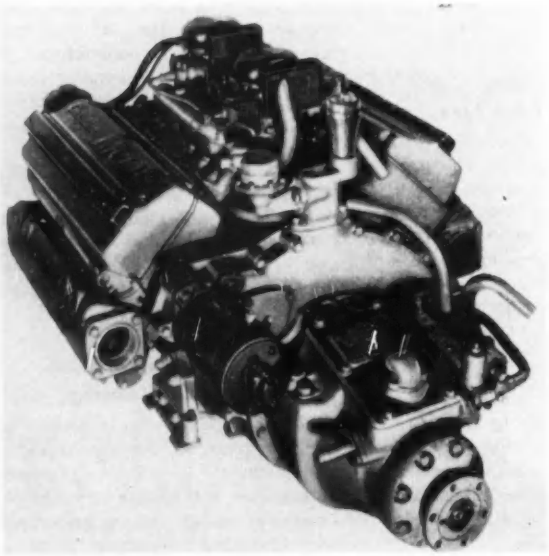
New Developments

The marine and industrial engine section of the show was highlighted by the unveiling of the new Chrysler Imperial Special V-8 gasoline marine engine (see cut). Developing 200 hp at 3800 rpm, the unit has a 331 cu in. displacement and a 7.2 to 1 compression ratio. The engine weighs 1103 lb in the straight-drive model, is 46⅛ in. long, 22 in. wide, and slightly less than 21 in. above the crankshaft centerline.

A second display of interest in the Marine and Industrial Engine Div. section of the show was a new lightweight, portable auxiliary generator developed through application of a 180-hp, V-8 industrial engine. Generating a capacity of 75,000 watts, the unit can be mounted on a one-ton truck, since weight is only 2250 lb.

Amplex Div. announced that it is expanding its facilities for increased production of Oilite self-lubricating parts in its new plant this month at Trenton, Mich. The facility has been equipped with presses and machines for the work.

Simultaneously, Cycleweld Products Div. disclosed development of a new industrial adhesive for permanently fastening rubber, metals, wood, plastics, ceramics or fibers together in any combination. The cement has already been adopted for use in building heavy machinery, radar, electronic equipment, and aluminum honeycombed panels for aircraft wings, fuselages, and stabilizers.



Chrysler Imperial Special V-8 marine engine.

Competitive Outlook

It was obvious from the opening remarks and answers to questions made by L. L. Colbert during the

aforementioned press conference that Chrysler has its loins girded for the current and future competitive struggle.

Field stocks of 1953 cars are down to 40,000, and there are somewhere in the neighborhood of 110,000 new 1954 cars in dealers' hands at the moment. Chrysler is convinced that it now has the best products in both car and truck field that it has ever had and intends to push them hard by all available means.

Although he was careful to point out that the Chrysler purchase of Briggs has not been fully consummated because approval of Briggs stockholders is still pending, Mr. Colbert expressed the opinion that the acquisition of the latter's body-producing facilities will be extremely advantageous to Plymouth in maintaining a high production rate.

Mr. Colbert went on to say that he anticipates a production of between five and five and a half million cars next year with Chrysler getting a higher percentage of that market. Supporting this prediction was his statement that Chrysler has a good dealer organization. He admitted that a hard selling era has already dawned but expressed confidence in the ability of the company to iron out successfully whatever problems may arise on that score.

Side Comments

In answer to other questions fired at him during the conference, Mr. Colbert said: Chrysler is definitely not engaged in any horsepower race despite the upping of the V-8 engine in some Chrysler models to 235 hp, but is interested only in the improved acceleration and safety which the increase brings; no other immediate price cuts on cars or trucks are anticipated; although Chrysler has not been approached as yet on the guaranteed annual wage, it is not enthusiastic about it; in spite of the fact that Chrysler was asked to submit a bid on the Willow Run plant, it did not do so; and Chrysler is continuing to work with plastics but sees no indication yet that they can replace steel in automobile bodies.

BOON TO THE FARMER

Recently introduced to the agricultural market is the new SD-4 farm tractor. Built by R. H. Sheppard Co., it has a four-cyl Model 16 Diesel engine with a 4½ in. bore and five-in. stroke. Maximum engine speed is 1650 rpm with full load and 1735 rpm with no load; compression ratio is 22:1. Other features are: 10-speed transmission; full-flow filtration engine lubricating system; heavy-duty hypoid pinion and ring gear; and bearings on both sides of bull gears and pinions. The versatile machine performs a wide variety of farming operations with ease as well as economy.

Thomas Says Red China May Open For Trade

Even though his comment that Communist China may open up as a large export market for automotive products kicked up a flurry of comment, C. B. Thomas, vice-president in charge of Chrysler Export Div., brought into the open for the first time the possibility that the government is considering opening up that market to American trade.

Speaking at a Chrysler press conference, he pointed out that the export market generally is on the downgrade. Many markets have closed during the past year and show little indication of opening up. He cited Brazil and Mexico, both formerly large importers of American automobiles, as two countries which either have been limited on foreign exchange or have imposed restrictions limiting the number of cars that can be brought in.

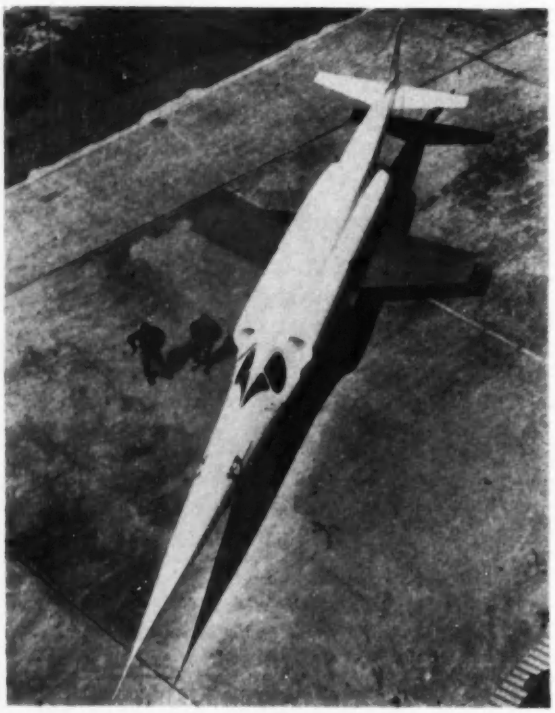
Mr. Thomas added that opening of the Communist China market would be a matter of Government policy and that Chrysler would sell automobiles to any point where the Government will agree to its shipping. He said that the market in China, if it opens up, will be a big one, particularly for trucks.

Automotive Collections Go to Detroit Library

Two important historical automobile collections are to be centered in the Detroit Public Library to make the Detroit collection the largest in the world. One of the collections was begun in 1896 and weighs five tons.

The other collection also goes back to 1896 and has many original documents of the Columbia Electric. Both collections contain many catalogs and drawings which are not duplicated anywhere, it is believed.

News of the AUTOMOTIVE



Douglas X-3 turbojet research plane.

Details of Douglas X-3 Disclosed by Air Force

The Air Force recently turned over to the National Advisory Committee for Aeronautics for further study a heretofore secret research aircraft. The X-3 was designed and built by the Douglas Aircraft Co.'s Santa Monica Div. under joint sponsorship of the Air Force, NACA, and the Navy.

The project was directed by the Air Research and Development Command to test the design features of an aircraft suitable for sustained, high-altitude flights at such momentous speeds as 2000 mph. The plane has been undergoing flight tests since October, 1952.

The appearance of the X-3 is quite striking. It has a slender fuselage with a long, tapered nose and short wings located well back toward the tail. When viewed from above, the X-3 resembles a huge stiletto.

Length of the X-3 is 66 ft, nine in., nearly three times its span of 22 ft, eight in. The top of its tail, rising on a boom over the twin-jet exhausts, measures 12½ ft from the ground. The aircraft stands on tricycle landing gear which retracts into the fuselage.

The plane is powered by two axial-flow turbojet engines. Military restrictions still prohibit disclosure of performance data. Titanium has been used extensively throughout the X-3. It carries a payload of 1200 lb of research instruments, instead of armament. Data obtained in the design, development, and flight testing of the X-3 is being made available to the aircraft industry.

English Firm to Make Ross Hydrapower Unit

Hydrasteer, Ltd., London, England, will manufacture Ross Hydrapower hydraulic power steering for English passenger cars and commercial vehicles under Ross license. Hydrasteer, Ltd., is the power steering division of Cam Gears, Ltd., a leading English steering gear manufacturer.

The Ross Hydrapower license was obtained after a tour of U. S. facilities and a study of U. S. power steering methods by Cam Gear, Ltd., engineers. A new building just outside London will house the new manufacturing operation, which will be confined to "linkage type" power steering units at the outset.

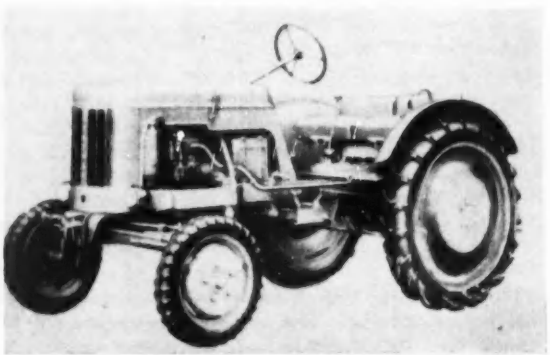
Chevrolet Powerglide Hits 1.5 Million

The automatic transmission is continuing to gain in popularity, and will account for roughly about one-third of Chevrolet's production this year. The division expects to equip about half a million cars with automatic transmissions this year out of its total of an expected 1.5 million.

The one-third percentage figure, however, cannot be considered a fair measure of acceptance because production facilities have not been adequate to meet the demand during the entire year and recently were expanded. Since it first introduced its automatic transmission in 1950 Chevrolet had produced 1.53 million units up to Nov. 1.

DIESEL TRACTOR

The new German Hanomag tractor has a one-cyl, two-c, water-cooled, Diesel engine with an output of 12 bhp at 1720 rpm. Transmission box is equipped with six forward and two reverse gears. The tractor has a hydraulically operated lift and is offered with 16 implements.



AND AVIATION INDUSTRIES

Willow Run Sale Is Another Milestone in Turbulent History of Kaiser

Clearest indication of the severe financial plight that led Kaiser Motors to sell its Willow Run plant to General Motors came in a special bulletin the company issued recently to its employes. John V. Banks, production manager at Willow Run, said the company could not reorganize its finances without selling the plant and using the proceeds to reduce its obligations to RFC.

Other reasons, he said, were: consolidation with Willys did not stimulate Kaiser and Henry J car sales; loss of defense contracts at Willow Run and other plants resulted in a large surplus of manufacturing space; and the general tightening of the market has affected all independents to the point where a very rough competitive year in 1954 lies ahead.

Transfer to Toledo

It has been well known that Kaiser would like to concentrate its production at the Willys operation in Toledo, where 5.2 million sq ft of floor space are available. Total area of all Kaiser and Willys plants, exclusive of Willow Run, is more than 8.35 million sq ft. Kaiser expects to install another assembly line at Toledo to build Kaiser cars but has not indicated whether or not the Henry J will be built there or possibly dropped from the line.

The $26 million price GM paid for Willow Run does not include tooling and equipment, which is to be moved by Kaiser to Toledo and possibly other Kaiser plants. Kaiser Motors will lease from GM at a nominal fee a large portion of the Willow Run facilites for the time being. These include press shop, body shop, paint shop, assembly area, receiving dock, certain balcony areas, a warehouse and experimental styling building. All the remaining facilities are to be turned over to General Motors within approximately 60 days. Kaiser also said that it will transfer its home office to Toledo within a year, and it is expected to vacate the plant within that time.

Current plans call for suspension of Henry J production early this month. The Willow Run facilities will operate as a body shop turning out both stampings and bodies to be shipped to Toledo, where Kaiser products will be built on Willys assembly lines. Kaiser also will complete its line of 1954 Kaiser show models at Willow Run.

End of an Era

Sale of the Willow Run Plant to General Motors and ultimate moving of all its operations to the Willys plant at Toledo actually marks the end of an era for Kaiser Motors and its predecessor, Kaiser-Frazer Corp.

The company, which entered the industry in 1945 with high hopes of becoming one of the largest independents, will "move in with relatives" when it centers its operations in Toledo at Willys Motors, its wholly owned subsidiary. It will depart from the huge Willow Run plant at a time when production of Kaiser vehicles is the lowest of any year in its history, except the first year of operation, 1946. Production up to Nov. 1 was less than 20,000 units, compared with a record of 160,000 cars in 1948.

The company has had a turbulent history involving Government loans totaling as high as nearly $75 million at one time. Congressional investigations led to a long drawn-out lawsuit over an abortive stock issue, and sizable operating deficits in all but two of its eight years of history have occurred. Since its organization in 1945, Kaiser-Frazer had a net loss of more than $51.2 million as of last Dec. 31. Kaiser Motors Corp., which resulted from the merger with Willys, lost more than $15.35 million in the first three-quarters of 1953 to bring the total as of Sept. 30 to almost 866.5 million.

Union Problems

The transfer of the plant to General Motors has raised some interesting problems in connection with organized labor. One of these is the ultimate disposal of the Kaiser pension fund.

Those Kaiser employes who elect to transfer to the Toledo operation will be included under the pension plan in effect there. Whether or not they will carry accumulated pension credits with them has not yet been decided.

Undoubtedly, many current Kaiser employes will not make the transfer and will be separated. The pension program does not provide any vesting in the fund, which is under the control of the trustees.

(*Turn page, please*)

REGIONAL SALES OF NEW PASSENGER CARS

Zone	Region	September 1953	August 1953	September 1952	Nine Months 1953	Nine Months 1952	Per Cent Change: Sept. over August	Per Cent Change: Sept. over Sept. 1952	Per Cent Change: Nine Months 1953 over 1952
1	New England	24,540	27,719	19,093	251,371	174,158	−11.47	+28.53	+44.16
2	Middle Atlantic	89,294	100,094	58,589	843,043	571,274	−10.79	+52.41	+47.57
3	South Atlantic	53,375	55,313	37,407	494,893	356,446	− 3.50	+42.69	+38.84
4	East North Central	117,820	128,607	80,454	1,143,907	773,238	− 8.39	+46.44	+47.94
5	East South Central	20,504	24,377	15,030	205,048	137,196	−15.89	+36.42	+49.45
6	West North Central	45,897	55,094	31,000	441,835	298,701	−16.69	+45.05	+47.92
7	West South Central	39,185	46,943	29,549	395,206	275,511	−16.53	+32.61	+43.44
8	Mountain	13,595	13,792	11,096	139,327	104,023	− 1.43	+22.52	+33.94
9	Pacific	49,596	50,491	36,652	455,715	324,296	− 1.77	+35.32	+40.52
	Total—United States	453,806	502,430	318,870	4,370,044	3,014,847	− 9.68	+42.32	+44.95

States comprising the various regions are:—Zone 1; Conn., Me., Mass., N. H., R. I., Vt.—Zone 2; N. J., N. Y., Pa.—Zone 3; Del., D. of C., Fla., Ga., Md., N. C., S. C., Va., W. Va.—Zone 4; Ill., Ind., Mich., Ohio, Wis.—Zone 5; Ala., Ky., Miss., Tenn.—Zone 6; Iowa, Kan., Minn., Mo., N. D., S. D.—Zone 7; Ark., La., Okla., Tex.—Zone 8; Ariz., Colo., Ida., Mont., Nev., N. M., Utah, Wyo.—Zone 9; Cal., Ore., Wash.

News of the AUTOMOTIVE

1953 NEW PASSENGER CAR REGISTRATIONS*

Arranged by Makes in Descending Order According to the 1953 Nine Months' Totals

MAKE	September 1953	August 1953	September 1952	NINE MONTHS Units 1953	NINE MONTHS Units 1952	Per Cent of Total 1953	Per Cent of Total 1952
Chevrolet	112,356	117,175	69,938	1,027,653	605,980	23.53	20.09
Ford	106,424	106,859	59,503	787,961	499,324	18.03	16.56
Plymouth	46,074	49,218	29,717	452,525	325,229	10.36	10.79
Buick	35,082	39,070	25,216	354,070	226,963	8.10	7.53
Pontiac	25,629	35,039	21,408	303,401	192,682	6.94	6.39
Oldsmobile	18,282	28,475	17,400	248,011	158,712	5.68	5.26
Dodge	19,174	21,988	15,270	228,401	186,814	5.23	6.20
Mercury	28,617	26,515	13,698	196,870	129,443	4.50	4.29
Studebaker	13,944	14,817	8,440	126,262	117,332	2.89	3.89
Chrysler	10,926	12,629	7,757	119,431	87,912	2.73	2.92
Nash	7,377	10,092	9,869	116,187	105,703	2.66	3.51
De Soto	9,538	10,162	6,157	93,490	67,853	2.14	2.25
Cadillac	3,086	8,429	8,854	77,728	66,325	1.78	2.20
Packard	4,458	5,110	4,296	60,577	51,577	1.39	1.71
Hudson	3,630	5,017	6,675	53,439	61,726	1.22	2.05
Willys	2,493	2,980	3,631	35,948	30,093	.82	1.00
Lincoln	2,862	3,986	2,775	32,846	20,744	.75	.69
Kaiser	1,181	1,630	3,219	20,316	30,368	.46	1.01
Henry J	529	955	1,696	9,726	23,605	.22	.78
MG (British)	462	477	726	5,574	5,696	.13	.19
Hillman (British)	309	355	530	3,565	3,549	.08	.12
Jaguar (British)	270	306	338	3,104	2,287	.07	.08
Ford (British)	211	217	284	3,019	2,699	.07	.09
Austin (British)	161	201	555	2,536	3,941	.06	.13
Allstate	30	59	181	633	1,251	.01	.04
Misc. Domestic	31	43	152	1,342	3,430	.03	.11
Misc. Foreign	990	644	583	5,439	3,609	.12	.12
Total—All Makes	453,806	502,430	318,870	4,370,044	3,014,847	100.00	100.00

* Based on data from R. L. Polk & Co.

Westinghouse to Consolidate Jet Work at Kansas City

Jet engine operations at its Lester, Pa., unit will gradually be transferred to its Kansas City, Mo., plant by Westinghouse Electric Corp. Work consolidation and labor troubles are said to be reasons for the decision.

Lester jet workers number 2600. Union leaders tried to block the move.

1953 NEW TRUCK REGISTRATIONS*

Arranged by Makes in Descending Order According to the 1953 Nine Months' Totals

MAKE	September 1953	August 1953	September 1952	NINE MONTHS Units 1953	NINE MONTHS Units 1952	Per Cent of Total 1953	Per Cent of Total 1952
Chevrolet	27,205	26,154	21,861	254,733	193,151	36.04	32.49
Ford	23,463	24,411	11,856	185,465	131,241	26.24	22.08
International	7,213	7,188	8,861	75,254	70,698	10.65	11.89
Dodge	8,181	8,288	8,909	65,600	77,293	9.28	13.00
G. M. C.	6,427	6,749	6,729	65,548	58,184	9.28	9.78
Studebaker	1,575	1,707	2,478	18,711	21,597	2.65	3.62
White	814	918	886	9,383	8,472	1.33	1.43
Willys Jeep	749	787	671	6,971	6,106	.99	1.03
Willys Truck	528	514	1,034	6,652	8,318	.94	1.40
Mack	631	613	558	5,306	5,477	.75	.92
Reo	273	258	306	2,741	2,429	.39	.41
Diamond T	297	316	273	2,617	2,614	.37	.44
Divco	217	147	268	1,805	2,174	.26	.37
Brockway	156	167	142	1,552	1,219	.22	.26
Autocar	130	138	130	1,312	1,152	.19	.19
Federal	110	81	66	786	636	.11	.11
Kenworth	64	76	66	623	548	.09	.09
Pontiac	32	49	36	365	379	.05	.06
Peterbilt	172	27	21	293	184	.04	.03
F. W. D.	39	34	26	285	370	.04	.06
Misc. Domestic	30	29	188	396	1,755	.06	.30
Misc. Foreign	23	23	17	206	236	.03	.04
Total—All Makes	78,319	78,673	65,381	709,606	594,233	100.00	100.00

* Based on data from R. L. Polk & Co.

(*Continued from page 37*)

It is understood that the union would like to have the fund allocated to employes, a move which would create an unprecedented situation. Whatever the outcome, it will be of interest to the entire automobile industry because it would set a precedent of vested interest which up to now has not existed.

Another situation involves the jurisdiction of the Kaiser local in the plant now owned by General Motors and occupied by the new owner. The local is resisting placement of workers from the GM local in such installations as the powerhouse and other maintenance units. The subject is expected to come up for considerable discussion in the near future by national UAW officials and General Motors.

Another complication is a demand by the General Motors unit of the UAW that location of Hydra-Matic operations at Willow Run creates a hardship on employes because of greater travel costs. This also is a new twist, since plant location has never been considered a matter subject to bargaining by the Union. To some observers it indicates an attempted encroachment on management prerogatives.

Dodge Separates Car, Truck Sales Staffs

Chrysler Corp. is taking definite steps to separate its Dodge truck activities from those of the Dodge passenger car but has stopped short of actually creating a separate truck division. Thus far, the program consists primarily of moving the sales organization to new quarters at the Dodge truck plant and creation of a more separated field organization.

The truck dealer organization is being built up and will be extended to other passenger car dealers in the Chrysler family in certain instances. In areas where Chrysler or De Soto dealers want a truck franchise and are willing to build the required sales and service facilities, they will be given the franchise, provided that it does not conflict with existing Dodge dealers in the area.

AND AVIATION INDUSTRIES

Tubeless Tire May Be on One Packard Model

A survey taken earlier this year among passenger car builders and tire companies indicated that the tubeless tire would not be found as standard equipment on 1954 models. This did not rule out the possibility, naturally, that one or more producers of higher priced cars might offer tubeless tires as an extra cost option.

It is interesting to note that Packard is rumored to be ready to offer tubeless tires as optional equipment on its highest priced 1954 model. This, however, has not been confirmed by the factory.

Cooperation Among Independents Seen

Even though both Nash and Hudson have confirmed that they are discussing possibilities of merger or possible integration, there is yet no definite indication of whether or not the two companies will be able to get together.

However, George Mason, president of Nash, has indicated some of the areas which could be explored for possible cooperation between independent automobile manufacturers. He said that a good project for cooperative effort would be in one design for low-volume models such as station wagons, in which two or more companies could take the basic body design and obtain identification through use of individual hoods and fenders.

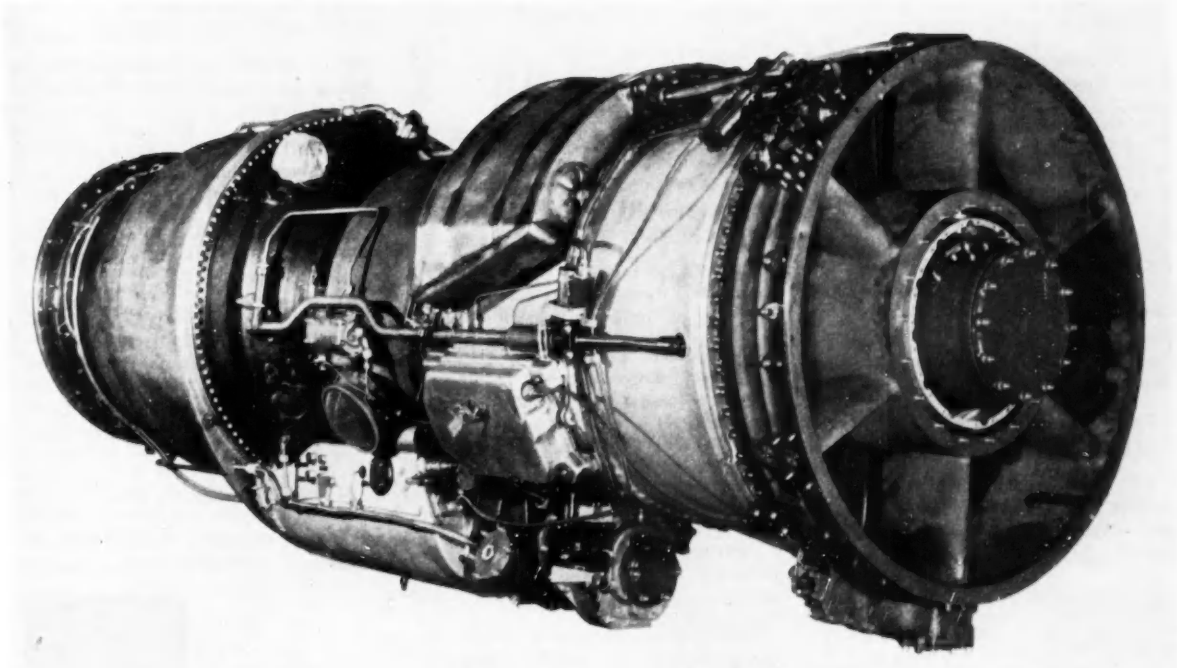
Another area would be the standardization of various mechanical components, such as crankshafts, camshafts, and even a basic engine block. Each company would get its individual performance characteristics through manifolding, compression pressure, and other alterations.

Mr. Mason also said that cost might be reduced through utilization of press and machine operations by one manufacturer when he has excess capacity which other independents could use. He said they also might trade or sell idle machines among the independent group. He added, however, that the talks with Hudson had thus far not reached the stage where any of these cooperative areas had been explored.

New Speed Record Claimed for North American F-100

The Air Force recently reclaimed the world's speed record for its North American F-100 Super Sabre (See AUTOMOTIVE INDUSTRIES, Nov. 15, p. 18). The plane thundered over a 15 kilometer course with one pass

Continued on Page 98



AWESOME AIRCRAFT POWERPLANT

The J-57 turbojet engine, built by Pratt & Whitney, was recently revealed by the Air Force to have an official rating in the 10,000-lb thrust class. Its design incorporates an arrangement of dual compressors in line which gives it a high compression ratio and an excellent fuel economy. The axial-flow engine powers the Boeing B-52 Stratofortress, the North American F-100 Super Sabre, and the Convair F-102. It is also slated to power the McDonnell F-101 and Navy aircraft. The engine is built by Ford at Chicago too.

Men in the News

GM Research Laboratories—Harry C. Mougey, technical director, and T. A. Boyd, research consultant who formerly headed the Fuel Dept. have retired.

Borg-Warner Corp.—**H. Hunter Gehlbach** has been elected an assistant secretary.

Allis-Chalmers Mfg. Co., Tractor Div.—**Neil Pohl** has been promoted to motor grader sales manager, Industrial Sales Dept.

Dodge Brothers Corp.—**John E. Friday** has been made business manager, Milwaukee region; **Dale Throckmorton,** Omaha region; and **Erland B. Knauss,** Minneapolis region.

Dodge Div., Chrysler Corp.—**Thomas A. Osthy** has been chosen regional manager for the Cleveland region.

B. F. Goodrich Co.—**Dr. Howard E. Fritz,** vice-president in charge of research, will retire Jan. 1, 1954.

General Electric Co.—**Kenneth G. Patrick** has been selected as manager of educational relations services in the company's Public Relations Services Div. He will be succeeded as manager of general public relations services by **J. Stanford Smith. Ralston B. Reid** has been named to replace Smith as manager of advertising and sales promotion for the Apparatus Sales Div.

Rosan, Inc.—**Howard P. Taylor** has been made director of public relations.

Wright Aeronautical Div., Curtiss-Wright Corp.—**Allan Chilton** has been appointed manager of the Inspection Dept.

Auto - Lite Battery Corp.—J. R. McDuffee has been appointed service manager.

Spicer Manufacturing Div., Dana Corp.—W. L. Stone has become transmission and torque converter sales manager, while W. H. Schomburg, Jr., is now universal joint and clutch sales manager.

Cleveland Quarries Co., Sterling Abrasives Div.—**Leslie B. Bellamy** is now general manager.

Westinghouse Electric Corp., Apparatus Div.—**Maynard B. Wyman** was named Engineering and Service Dept. manager and **H. C. Coleman,** assistant manager.

Trailmobile, Inc.—**Joseph O. Young** has been promoted to vice-president in charge of branch operations.

Lear, Inc., Grand Rapids Div.—**J. C. Owen** has been appointed chief engineer, instrument products.

Raybestos-Manhattan, Inc.—**S. V. V. Hoffman** is now district manager—West Coast sales district.

Wagner Electric Corp.—**Harold S. Garrett** has been appointed assistant director of purchases and production planning and **Harold K. Kramer,** purchasing agent.

BullDog Electric Products Co.—**Louis H. Hopper** has been named manager of the Eastern region.

Hydro-Aire, Inc.—**Dale A. Lichty** has been elected vice-president in charge of sales.

Minneapolis-Moline Co., Export Sales Div.—**Harold W. Lage** has been named export service manager.

Metals Disintegrating Co.—**Julius F. Sachse** has been appointed vice-president in charge of research and development.

Euclid Road Machinery Co.—**V. L. Snow** has been promoted to the position of director of sales. **J. E. Ehlert** has been named manager, domestic sales.

Mack Trucks, Inc.—**L. E. Reeve** has been elected treasurer.

Flexonics Corp., Elgin Div.—Carl W. Schwendener has become factory manager, while Fred A. Abben is now industrial relations manager.

Superior Coach Corp.—**Laurence H. Larsen** had been named executive vice-president and treasurer.

Raymond Engineering Laboratory—**Lincoln Thompson** has been made a vice-president.

Aluminum Industries, Inc.—**Richard G. Tessendorf** was elected a vice-president.

Ford Div., Ford Motor Co.—**Holmes M. Brown** has been appointed manager of public relations.

Westinghouse Air Brake Co.—**Earl D. Hilburn** will become vice-president, Government contract service.

Piasecki Helicopter Corp.—**John N. Eustis** has been named director of procurement.

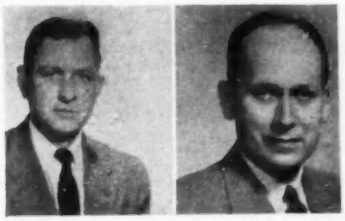
Cuno Engineering Corp.—**Wilfred G. Schneider** has been elected vice-president in charge of manufacturing.

Standard Tube Co.—**Paul J. Selinger** has been chosen manager of stainless tubing sales.

Westinghouse Electric Corp., Transportation and Generator Div.—**A. M. Harrison** was named manager of the Engineering Dept., and **P. G. Lessmann,** assistant manager. **C. M. Laffoon** has been made assistant manager of the division.

AiResearch Aviation Service Co.—**Edmund L. Ryder** has been appointed assistant manager and **Frank R. Berry, Jr.,** chief engineer.

Kropp Forge Co.—John B. Mitchell has been appointed general sales manager.



Firestone Tire & Rubber Co. — J. D. Sharkey has been appointed manufacturers sales manager, and Harold H. Vischer has been promoted to manager of passenger tire sales.

Kaiser-Willys Sales Div., Willys Motors, Inc.—**Stanley W. Wasil** has been named manager of dealer business management.

Mercury Mfg. Co.—**O. T. Henkle, Jr.**, has been made executive vice-president, **P. K. McCullough**, vice-president—sales, and **J. D. Appleberry**, plant manager.

American Brake Shoe Co., Electro-Alloys Div.—**Charles M. Ruprecht** is now president.

Chrysler Corp. of Canada — **J. P. Cummings** has been appointed chief engineer.

Lockheed Aircraft Corp.—**John H. Carter** has been named assistant director of development planning.

Consolidated Engineering Corp.—**James R. Bradburn** has been promoted to vice-president in charge of the Computer Div.; **Joseph H. Lancor, Jr.**, has become vice-president—engineering; and **Walter B. Claus** is now director of the Transducer Div.

Eclipse - Pioneer Div. Foundries, Bendix Aviaton Corp.—**Larry Eigenrauch** was named sales manager, while **Willard Neuert** succeeds him as production manager.

Hercules Motors Corp. — **John C. Keplinger** has been elected president and **Charles Balough**, chairman of the board. Other appointments are: **Lawrence G. Downey**, vice-president; **George W. LaSalle**, vice-president; **F. H. Geisler**, director of sales; and **Dr. E. A. V. Horiak**, chief engineer.

Damascus Tube Co. — **Alfred B. Kerber** has been made sales manager.

Hydro - Line Manufacturing Co. — John H. Harding has been made sales manager.

Plymouth Motor Corp. — G. J. Cutler was chosen field service manager.

Barber-Colman Co., Machine and Small Tool Divs.—**Robert A. Horner** is now divisional manager, **Leo W. Reuland** has been promoted to sales manager, and **Fred B. Jensen** succeeds him as production manager.

Wheels, Inc. — **Edward H. Regan** and **Edward D. Meeker** have been elected vice-presidents and directors.

Chrysler Corp., Export Div.—**Thomas W. Koos** has been made executive regional manager for Europe and the Near East.

Lindberg Steel Treating Co.—**Kenneth U. Jenks** was elected a trustee of the Metal Treating Institute.

Scintilla Div., Bendix Aviation Corp. — **Donald B. Morse** has been chosen sales manager.

Bryant Heater Div., Affiliated Gas Equipment, Inc.—**Thomas E. Gravenstreter** has been named manager of air dryer sales.

Kaiser - Willys Sales Div., Willys Motors, Inc.—**Sam F. Green** is now merchandising manager for commercial cars and jeeps.

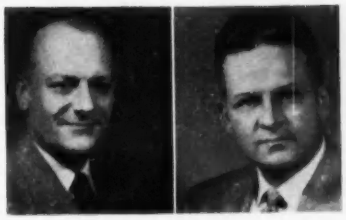
Evans Lead Div., National Lead Co. —**A. M. Neumann** has been made chief engineer.

Allis-Chalmers Mfg. Co.—**Willis G. Scholl** was elected to the board of directors.

Perfect Circle Corp.—**Lothair Teetor** resigned as chairman of the board to become Assistant Secretary of Commerce for domestic affairs, although he remains a member of the board. **Ralph R. Teetor** has replaced him as chairman.

Textileather Corp.—**Paul S. Ridley** has been appointed chief plant engineer, and **James W. Brady** has been named chief industrial engineer.

Micromatic Hone Corp. — William H. Harris, Jr., has been elected to the board of directors.



AC Spark Plug Div., General Motors Corp. — Warren E. Milner was chosen works manager, and Hubert L. Curtis, manufacturing manager.

William Miller Instruments, Inc.—**George W. Downs** has been appointed vice-president and chief engineer; **Edwin M. Graham**, vice-president and treasurer; **Charles T. Munger**, secretary; **Rex Welch**, general sales manager; and **Paul Ashway**, production manager.

American Bosch Corp.—**Charles W. VanOverbeke** has joined as field engineer in the firm's Chicago office.

Westinghouse Electric Corp., Switchgear Div. — **C. P. West** was named assistant to the manager.

National Lead Co. of Ohio—**Alex Stewart** has been named vice-president, director and general manager.

Lockheed Aircraft Corp.—**Rear Admiral William T. Rassieur, USN (ret.)**, has joined the company as a military requirements representative.

Necrology

John A. B. Smith, 72, retired secretary and treasurer of Curtiss-Wright Corp., died Nov. 12, at Middleboro, Mass.

Howard A. Schlieder, a member of the executive staff of Revere Copper & Brass, Inc., died Nov. 15, at Danbury, Conn.

J. P. Mueller, past president and director of National Standard Parts Association, died Nov. 4, at Fort Worth, Tex.

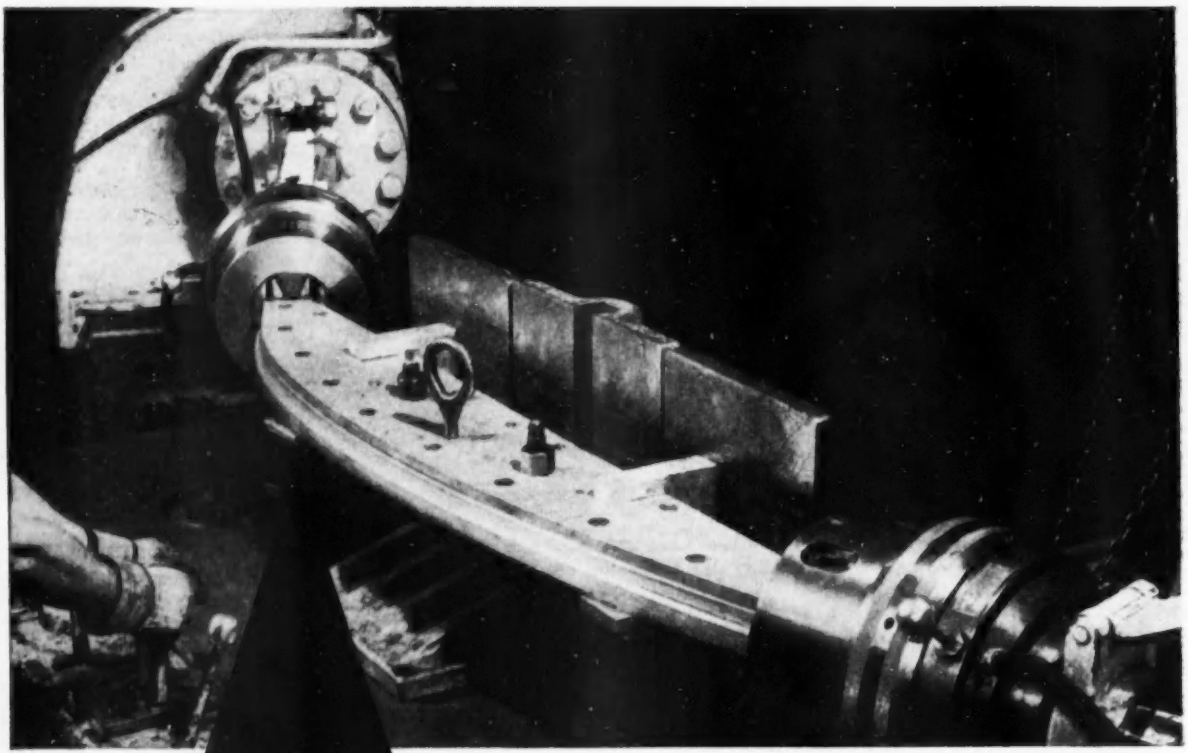
Harry J. Crawford, 86, director and chairman of the board of Quaker State Oil Refining Corp., died Nov. 3, at Oil City, Pa.

John D. Siddeley, 87, pioneer in the formation of Armstrong-Siddeley Motor Co. and the Siddeley-Hawker aviation group, died Nov. 2, at Jersey, Channel Islands.

Johnston B. Campbell, 80, former chairman of the Interstate Commerce Commission, died Nov. 5, at Spokane, Wash.

This stretch forming die is aluminum (Alcoa Aluminum Tool & Jig Plate) because aluminum dies are lighter, easier to handle, faster to machine and cost less to make than those of steel. Many manufacturers are using Alcoa Tool & Jig Plate for assembly and machining fixtures, dies for low-pressure molding of rubber and plastic, and dies like this one which form aluminum sheet.

Alcoa Tool & Jig Plate is a cast product, fully normalized and strain relieved. It is available from stock in thicknesses of ⅜″ to 4″ and in dimensions up to 48″ x 96″. For full information on Alcoa Tool & Jig Plate, contact your local Alcoa sales office . . . or write Aluminum Company of America, 1951-M Alcoa Building, Pittsburgh 19, Pa.



This Stretch Forming Die is Aluminum

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

Double Diamond GEARS are built...

. . . to produce low installed cost

. . . to serve economically and dependably on the job for which you buy them

. . . and to do credit to your product and your reputation

The above quotation appears in the introduction of our new 40-page reference book which fully describes the ten types of gears in which we specialize. If you are interested in gears built to those standards have your secretary write for a copy of the complete catalog.

DOUBLE DIAMOND TRADE MARK GEARS

AUTOMOTIVE GEAR WORKS

RICHMOND, INDIANA

FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS

The completely new approach
to contour turning is
the New

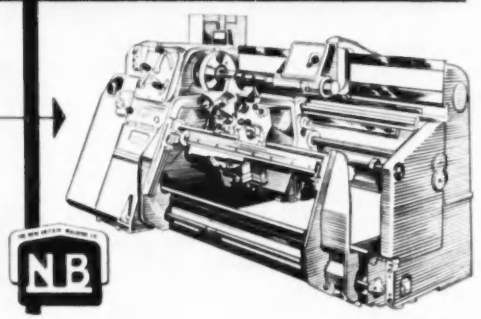
NEW BRITAIN +GF+ *Copying Lathe*

Equally suitable for long or short runs with simplicity of operation . . . minimum set-up and change-over time . . . reduced handling and checking time . . . elimination of expensive tooling.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division, New Britain, Connecticut

NEW BRITAIN *Automatics*

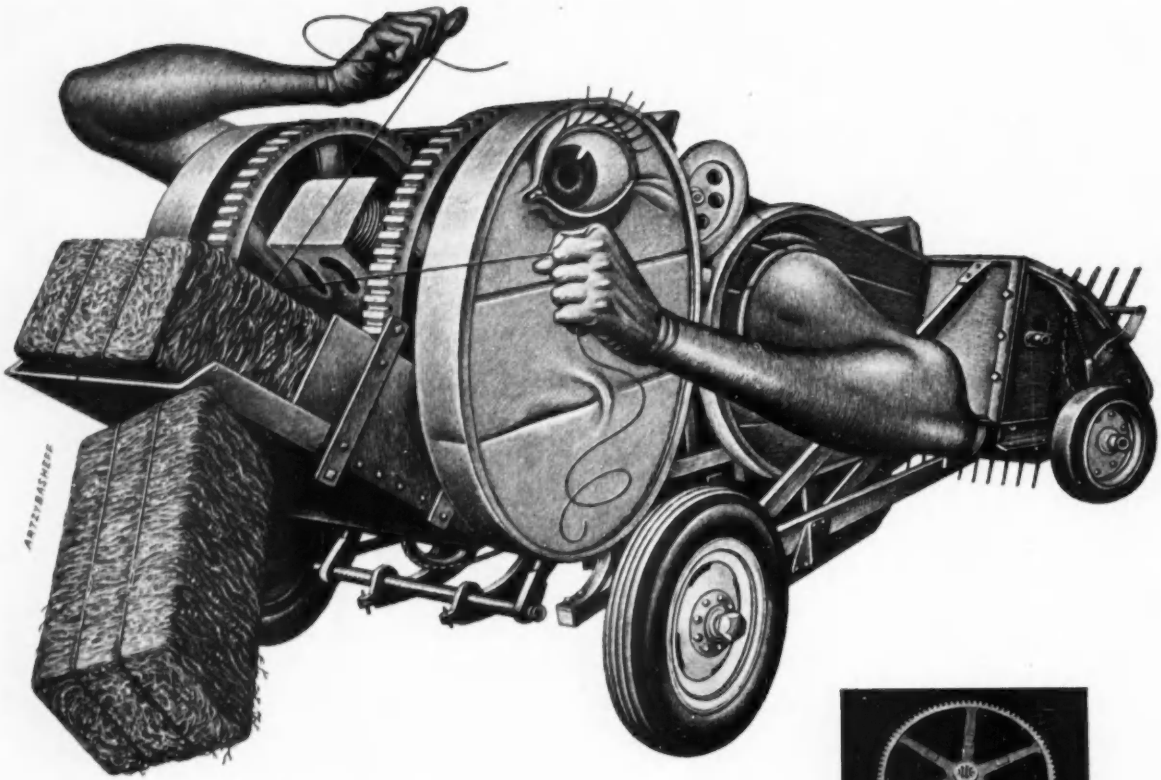
Machines for Making Progress
Automatic Bar and Chucking Machines
Precision Boring Machines
Lucas Horizontal Boring, Drilling and Milling Machines
New Britain +GF+ Copying Lathes



Precision
"O" Ring
Seals make these
Fittings work!
For leak-proof sealing under high pressures, the full-flow hydraulic hose assemblies made by *Resistoflex Corporation*, Belleville, N. J., require "O" Rings engineered to the most exact tolerances. Naturally, *Resistoflex* engineers specify *Precision* "O" Rings—as their very name tells the story—*complete accuracy*.
Everyone is finding *Precision* "O" Rings the best answer to many sealing problems—and they are finding, too, that *Precision* leads the field in engineering help and proper deliveries to keep production lines going. Let us help you. Send for our "O" Ring Handbook and let us have your inquiries.
FREE—Write for your personal copy of our Handbook on "O" Rings.

Precision Rubber Products
CORPORATION
"O" Ring and Dyna-seal® Specialists

Dept. 5, Oakridge Drive, Dayton 7, O. Canadian Plant at: Ste. Thérèse de Blainville, Québec



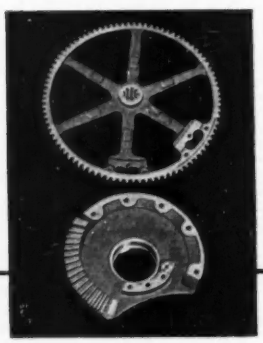
Strong "wrists" for America's new hay balers

Whisking through fields of hay . . . picking up and handling an almost incredible 2,500 bales per day . . . this man-saving, time-saving, money-saving NEW IDEA hay baler needs mighty tough gears to keep its tying mechanism on the job. To be certain these steel "wrists" have maximum strength and durability . . . NEW IDEA looks to Lycoming.

Do *you* need a precision part . . . volume production of a metal product . . . a dependable air-cooled engine . . . or development of "just an idea" in the rough or blueprint stage? Then remember—many of America's industrial and military leaders credit Lycoming with solving their most complex metal-working problems. Whatever your problem . . . *look to Lycoming!*

More than 6,000 machine tools, a wealth of creative engineering ability, and 2½ million square feet of floor space stand ready to serve your needs when you look to Lycoming.

AIR-COOLED ENGINES FOR AIRCRAFT AND INDUSTRIAL USES • PRECISION-AND-VOLUME MACHINE PARTS • GRAY-IRON CASTINGS • STEEL-PLATE FABRICATION



For sturdy, unfailing spur and bevel gears—"wrists" that drive the tying mechanism of its "one-man" hay baler—NEW IDEA looks to Lycoming for precision production.

For a more complete story on Lycoming's varied abilities and facilities, write—on your company letterhead—for the illustrated booklet, "Let's Look at Lycoming."

FOR RESEARCH • FOR PRECISION PRODUCTION

LOOK TO **LYCOMING**

Lycoming-Spencer Division, Williamsport, Pa. AVCO Bridgeport-Lycoming Division, Stratford, Conn.

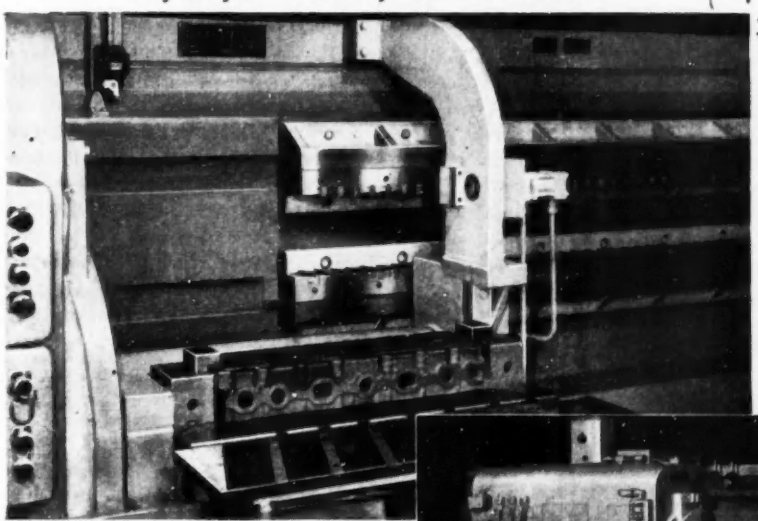
another SCOOP by LAPOINTE

Leading the field in broaching machine design and engineering, LAPOINTE'S radical, new

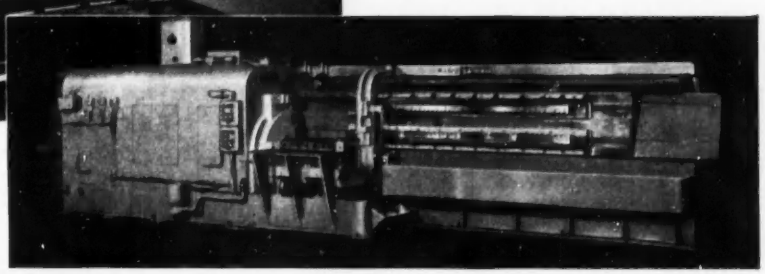
ELECTRO-MECHANICAL DRIVE horizontal BROACHING MACHINE

is already performing production miracles in automotive plants. Broaching speeds of 50 to 150 feet per minute are practical with conventional type broaches, but carbide-tipped broaches can be used when taking advantage of the machine's amazing broaching capacity up to 300 feet per minute . . . and more!

For full information, send for Bulletin **SRHE-10**



Operating entirely without vibration or chatter, this Lapointe SRHE Broaching Machine, 50 hp, 150-inch stroke, removes 3/16" stock per surface on the manifold face and opposite pads on cast iron *Cylinder Head* parts. Return speed is 150 feet per minute. Yield is 120 completed parts per hour at 80% efficiency. This lack of vibration results in *longer tool life* of 100% or more!



The exclusive Lapointe "Tilt-In" Fixture and work holder are hydraulically operated in synchronism with the broach assembly travel, so there is no delay awaiting the return stroke.

THE LAPOINTE MACHINE TOOL COMPANY
HUDSON, MASSACHUSETTS, U. S. A.

Body Engineers Technical Convention—

Plastic Dies, Reinforced Plastic Bodies, Aluminum Die Castings, Air Conditioning and Other Timely Developments Highlight Largest Meeting Ever Held by ASBE

By
James R. Custer

A LITTLE over a year ago, the possibilities of plastics for passenger car bodies and other functional automotive applications stirred the imaginations of many engineers who attended the annual technical convention of the American Society of Body Engineers. Manufacturers of glass fiber and resin presented their latest developments for that purpose, technical papers were devoted to reinforced plastics, and two sports cars with reinforced plastic bodies were demonstrated during the convention.

Since then America has become plastic car conscious. General Motors introduced some sports cars with plastic bodies at its Motorama early in 1953 in New York City and six months later Chevrolet began production of the Corvette, one of the special cars at the Motorama. Most automobile companies and body manufacturers are reported to have reinforced plastics projects underway behind "closed doors," including use in dies. It was indicated that some special plastic cars are being rushed for public display after the first of the year.

This year at the ASBE convention late in October at Detroit, reinforced plastics again received considerable attention. It was the largest meeting ever held by that organization, with several hundred engineers and designers in attendance at the eight technical sessions during the three days. The total attendance for all functions, including the open house and exhibits, was 2500.

Dr. Robert G. Nelb, manager of Vibrin resin development at Naugatuck Chemical Division of United States Rubber Co., in analyzing the progress made with plastic bodies, stated that by early 1954 a sizeable percentage of their parts will be produced by the preform and matched die technique. Chevrolet has announced that it will adopt this method for Corvette bodies.

Much interest also was centered on plastic tooling. Renite Plastics, Inc., announced its new surface coating and casting material of modified epoxy resin for short-run forming and drop hammer dies. Kish Plastic Products, Inc., another exhibitor, also uses epoxy resins for making reinforced plastic dies, core boxes and prototype parts.

Dr. J. W. Donnell, Kish research director, in his paper, "New Plastic Materials for Tools and Dies," concluded that the phenolics, polyesters and epoxy resins are the best with each one having its place in the tool and die field. Phenolic plastic is best suited for a Keller model, epoxy resin for coating dies made with a polyester core, and reinforced glass cloth-epoxy resins for drill fixtures.

Thus, it is apparent from these few examples, Dr. Donnell emphasized, that the tool and die business cannot choose just one plastic, but must use that plastic that best fits the purpose. Auxiliary developments include a high temperature (350 deg) wax type material to place on model to take care of metal thickness when casting sheet metal dies of epoxy resins. Various new parting compounds such as the polyvinyl alcohols and silicones have recently been developed. New plastics and new techniques are being developed constantly. One that is still in the process of development, but close to marketing, is a high temperature epoxy—a cast or laminated material that can withstand temperatures of 400 to 500 F without the great loss in physical properties ordinarily suffered at this temperature by standard epoxies.

Still another plastic in the process of development is a vinyl putty. This substance in the uncured state can hardly be differentiated from ordinary molder's clay. When, however, the uncured putty (after being modeled into any desired shape) is subjected to temperatures of 300 F for some 15 minutes it cures to a permanent rubber-like material, somewhat harder than the rubber in the automobile tire tread. This cured model can be used as a form to cast phenolic or epoxy dies and tools, directly or indirectly. Some further work needs to be done to establish its non-shrink properties. A further development with this vinyl putty is the use of a mechanical device somewhat like a planograph to carve out the model directly from tracing the part drawing.

Developments in the use of the highly heat resistant silicone resins for tools and dies have been slow. The high cost of the material, the high temperature required for curing and the curing pressure require-

ments have delayed the use of this resin in such tools as hammer forms. Recently, the curing pressure has been lowered to below 15 psi. This, in itself, will go a long way toward making silicones available for tools and dies, Dr. Donnell stated.

In his paper, "Types of Dies and Their Functions," Arthur Manoli, assistant general superintendent of the Tool, Die & Fixture Division, Briggs Manufacturing Co., reported that Briggs is making a few plastic dies and thereby gradually acquiring "know-how" in this field. He predicted that plastics would be applied more and more as their experience with them is broadened.

Aluminum Die Castings

A strong competitor in the automotive market is the die casting and a comprehensive review of its status was given in a paper by J. C. Fox, chief metallurgist of the Doehler-Jarvis Division, National Lead Co. He predicted increasing use of aluminum die castings and cited die cast aluminum automatic transmission cases and aluminum differential housings as possibilities in the near future. Today, he said, at least 90 per cent of all automatic transmission valve bodies are aluminum die castings, not only for their lightness, but also because of their low cost.

In anticipation of a demand for large die castings, the latest machine developed by Doehler-Jarvis measures 72 in. between bars and is capable of producing aluminum die castings up to 75 lb and zinc die castings up to 180 lb. One of the developments now underway with this machine is a complete aluminum cylinder block. Other contemplated applications of aluminum die castings are the cowl and instrument panel. Recent applications of aluminum die castings include torque converter and clutch housings, garnish moldings, shrouds for steering columns, brackets, window lifters and similar parts.

Another ASBE technical session was devoted to safety engineering, the many phases of which were analyzed by a panel consisting of Thomas Bannister, design supervisor of De Soto styling; Glenn F. Doyle, supervisor of Ford body and structures laboratory; and Howard K. Gandelot, vehicle safety engineer, General Motors Corp.

It was emphasized that engineers are trying to provide in new automobile designs safer, more dependable and more comfortable travel. However, these efforts are often nullified by such counter factors as errors in human judgment while driving, gross neglect of proper maintenance of tires, brakes and other safety measures, and excessive high speeds.

L. H. Nagler, Nash engineer, in his discussion pointed out that Nash offered safety belts as an option for its 1950 models. Approximately 50,000 belts were supplied, but it is estimated that about 49,900 of them were never used because passengers would not be bothered with the inconvenience of being strapped in. The seat belt option was dropped before the end of the 1950 model run.

Air Conditioning Problems

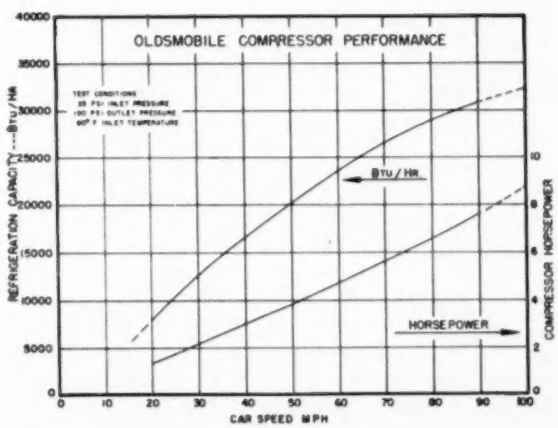
The design of the Oldsmobile air conditioning system, its operation, performance, and the problems that had to be solved to provide satisfactory comfort, were described in a paper by E. M. Estes, chief body engineer at Oldsmobile. He said inside air temperatures can be maintained from 69 to 72 F with outdoor temperatures 78 to 104 F at car speeds above 35 mph. Performance curves showing the output and horsepower required data on the Oldsmobile-Frigidaire compressor are given in the accompanying chart. Mr. Estes noted that the capacity at 50 mph is 20,000 Btu per hour or approximately 1 2/3 tons, while a one-horsepower home air conditioner has a 9000 Btu per hour capacity. Total weight of the Oldsmobile air conditioning system is 255 lb, 143 lb on front wheels and 112 lb on rear wheels.

In his paper Franklin W. Edwards, Detroit sales manager of the Heater Division, Eaton Manufacturing Co., discussed the car air conditioning unit of the future. He advocated that the system should be contained in a single box small enough in physical size so that it could be installed easily in a car without reducing usable space for passengers, engine or luggage. He contended that it should leave its point of manufacture completely assembled, charged, tested, warranted, ready to cool, ready to be easily set in place in the car, either at the car assembly plant or in the field.

At present, it was stated, the automobile industry is interested in three power sources with considerable development work progressing on electrical drives, oil pump-motor combinations, and mechanical drives. The electrical drive probably will have a large capacity 3000 to 4000 watt, high voltage, alternating current generator, located in the engine compartment in place of the present generator and equipped with rectifiers for supplying lower direct current voltage required for lighting and ignition. A 3-hp motor would drive the compressor.

The oil pump-motor combination probably would consist of a setup similar to that used in power steering. A mechanical drive would likely consist of a power takeoff and clutch mounted to the engine, probably belt-driven in its early development stages. From

(*Turn to page* 106, *please*)



Lincoln Capri convertible. Greater visual length has been obtained by new styling treatment on the side molding and a new rear quarter gravel shield embossment.

Lincoln 1954 Improvements

LINCOLN for 1954 has numerous mechanical improvements and styling refinements rather than radical design changes. Models offered are the Lincoln four-door sedan and hardtop coupe, and the Lincoln Capri four-door sedan, hardtop and convertible.

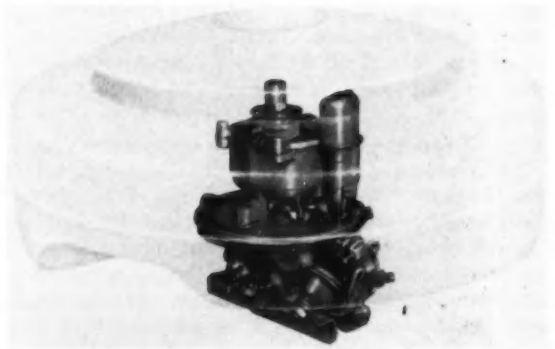
Styling has been enhanced by the introduction of a new theme on the front and sides. The massive, wide, and low look has been accented by a new bumper guard air scoop and the addition of three vertical bars located between the upper and lower impact bars. This wider appearance is further emphasized by the outboard position of the parking lights and turn indicators. Restyling of the side moulding adds greater visual length and a newly designed rear quarter gravel shield accents the lowness and length of the car.

Integral back-up lights have been combined with the tail lights as standard equipment on all models.

Brake diameter is increased to 12 in., resulting in a 10 per cent increase in the braking area to 220 sq in. With this additional capacity, a quarter to a third less effort is required to stop the car at given speeds.

Although the Lincoln V-8 engine remains unchanged in basic specification details and is still rated at 205-hp (max.), a number of important improvements have been made for 1954. The four-venturi carburetor features primary venturis operated by the accelerator pedal while secondary venturis are vacuum-operated and thus divorced from the pedal linkage. Secondary venturis are automatically closed, for safety, whenever the throttle is closed.

One of the distinctive features of the carburetor is a new anti-percolating device that permits fuel vapors to pass out harmlessly, leaving the intake manifold dry. This venting action takes place automatically only when the engine is idling or stopped. Usually when an engine is stopped after a hard run on a hot day, temperature of the carburetor continues to rise for a short interval. Sometimes this causes fuel to boil out of the carburetor bowl and run into the intake manifold. This is the condition that will be eliminated by the new device. When the throttle is opened, the vent is closed, thus permitting normal carburetor operation.



Phantom view showing new Lincoln four-venturi carburetor with outline of larger air cleaner.

Distributor control for 1954 has been improved by the introduction of a single-diaphragm control unit, replacing the former dual-diaphragm control. Greater sensitivity of the new diaphragm eliminates the need for the previous mechanical linkage, and is said to assure sufficient initial spark advance for smooth, posi-

(*Turn to page* 134, *please*)

The stake bodies in the 1954 Chevrolet truck line have greater loading space with platforms both longer and wider inside the racks. This is the 12-ft stake body on the heavy-duty chassis in the 6400 Series.

Chevrolet Trucks *have* More Powerful Engines

AMONG the features of Chevrolet trucks for 1954 are three engines with increased horsepower and improved all-around performance; automatic transmissions optional through the one-ton (10,000 lb GVW) model range; and a new Ride-Control seat, standard on COE models and optional on all other cabs.

There are heavier axle shafts in the two-ton models, bigger clutches on light- and heavy-duty models and more rigid frames on all models. Optional heavy-duty three-speed transmission available on light- and medium-duty models offer greater gear reduction, more rugged construction and a steering-column gearshift lever on one-ton models.

More space has been provided for payloads and easier loading. The body height of pickup, platform and stake models has been lowered through modified body mountings. Unobstructed loading space has been lengthened on several models.

In pickup bodies, although the sides are higher, the over-the-side loading height is less. The rigid, grain-tight tail gate will support long loads when lowered.

Major changes have been made in the new Thriftmaster and Loadmaster truck engines. Increased compression ratio of 7.5 to 1 provides greater economy and 112 hp. Other features are full-pressure lubrication, lightweight aluminum pistons, insert-type connecting rod bearings, more rigid crankshaft and connecting rods and strengthened valve-operating mechanisms. Exhaust valve rotators, XCR valves and chrome top piston rings are standard equipment as respects the new Loadmaster engine.

For heavy-duty models the most powerful truck engine in Chevrolet history, the Jobmaster, is offered as optional equipment. With a piston displacement of 261 cu in. and a compression ratio of 7.17 to 1, it develops 135 hp. Cylinders are larger and a new high lift cam provides freer breathing. Exhaust valve rotators, XCR valves and chrome top piston rings are standard.

The new engine is equipped with a carburetor having $\frac{1}{8}$ in. larger main venturi and throttle body diameters. The stroke of 3-15/16 in. is the same as the regular engine, but the bore is $3\frac{3}{4}$ in. instead of 3-9/16. Pistons, rings, connecting rods and pins are correspondingly larger and sturdier. More rigid valve rocker arms are used and the rocker shaft wall is thicker.

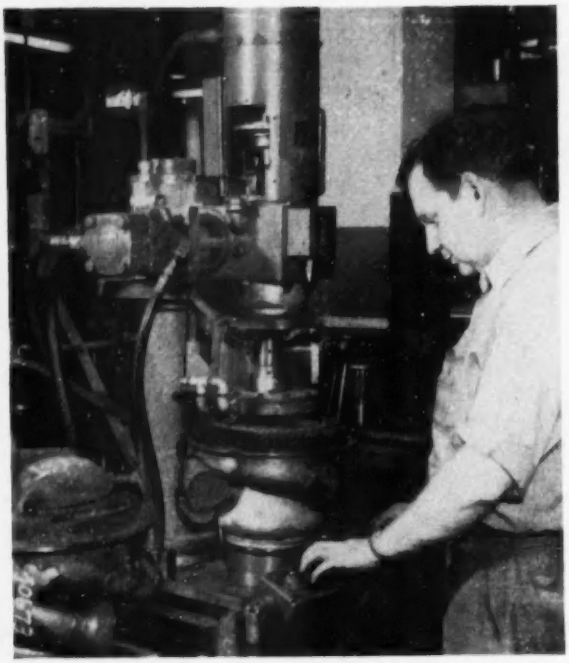
The Thriftmaster is standard in the 3100, 3600, 3800 and 4000 series trucks; the Loadmaster is standard in 5000 and 6000 series, and on forward-control models, and is optional in the 4000 series. The Jobmaster engine is optional in Series 5000 and 6000.

The cylinder head is new on all these engines, with inlet valve guides shorter than in 1953. Valve operating noises are better suppressed with the new valve rocker cover, attached by four bolts on its gasket ledge. This system also provides a better gasket sealing for protection against oil leakage. Reinforcing ribs and flanges, thicker intermediate bearing bulkheads and caps for mounting the crankshaft make the new cylinder block stronger.

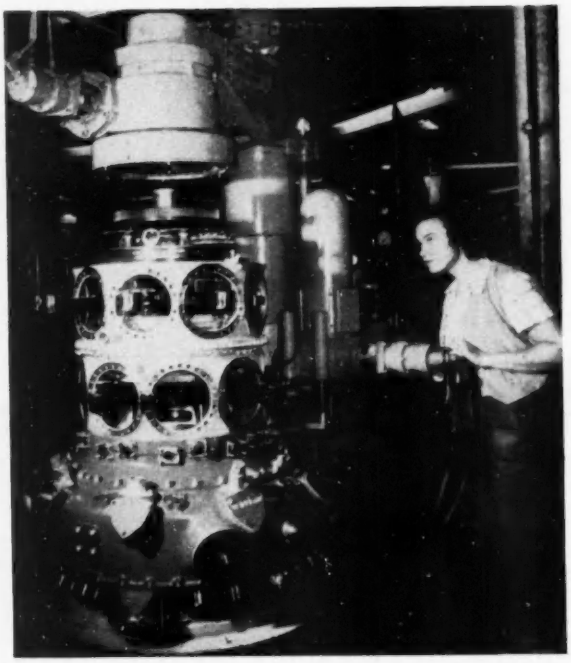
A fan shroud on heavy-duty models and a four-bladed fan with greater pitch on the Jobmaster engine provide for the increased cooling requirements of the more powerful engines.

The automatic transmission is a new optional

(*Turn to page* 114, *please*)



This machine tightens the turbine wheel nut and stretches the turbine shaft of a power-recovery turbine.



The reduction drive gear of the power section of the engine is tightened and locked on above automatic torque machine.

Wright Turbo Compound Engines Built on Automatic Assembly Lines

FIRST of its kind in the aviation engine industry, the new automated progressive assembly line at the Wood-Ridge, N. J., plant of Wright Aeronautical Div., Curtiss-Wright Corp., is devoted to the production of Turbo Compound engines. The use of conveyor lines and pallets for moving engine parts to sub-assembly stations results in a large saving of time, while automatic torque machines reduce manual effort and assure uniform results.

Conservation of space is another advantage of the new setup. Area of the assembly line prior to automation was 166,920 sq ft; with the automated line, space requirements have been reduced to a total of 97,714 sq ft. Since introduction of new assembly line procedures, the finished stores area of 27,783 sq ft can accommodate about 50 per cent more engine parts.

The area consists of 15 different conveyor lines from which detailed engine parts are removed, placed in either automatic torque and assembly machines or assembly fixtures, and assembled into sub-assemblies.

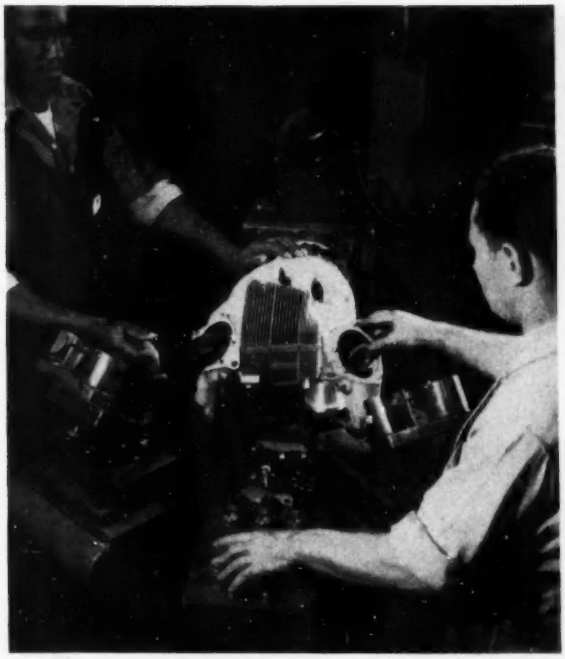
Extensive use is made of protective-coated pallets in moving engine parts to sub-assembly stations. The protective coating of these pallets, of which there are 45 types, varies in hardness according to the weight of the engine part to be handled.

Major engine parts, such as crankcase front sections, connecting rods, and rear housings, are moved from the finished stores area on carriers over a roller floor-type conveyor to the conveyor loading area. The parts are placed in protective-coated pallets, washed, and moved to the green assembly benches and stations.

Minor parts, such as nuts, bolts, and wire, are delivered to green assembly stations by rolling bins.

The green bench assembly area is adjacent to finished stores and is supplied by a roller conveyor system which originates in finished stores. The bench assembly area consists of 15 different conveyor lines from which detailed engine parts are removed, placed in either automatic torque and assembly machines or assembly fixtures, and assembled into the various sub-assemblies such as cylinders, crankcase front sections, rear housings, and crankcases.

The sub-assemblies are then placed on pallets on the roller conveyor, moved to the end of the line,



Springs are locked into place by this machine which then resets to depress the spring so that a rocker arm can be dropped in.

placed in slings, and moved by overhead monorails to the green pre-line assembly.

The three major sections of the Turbo Compound, such as the crankcase front section, power section, and rear section, are then placed into special flush and test rigs that insure cleanliness and test for performance by simulating conditions that exist in engine operation.

The green pre-line assembly area includes seven stations where assembly of the various sub-assemblies into the basic engine takes place, excluding external parts. The various parts and sub-assemblies, received via overhead monorails or rolling bins, are assembled by use of fixtures and special machines so designed that the work is positioned in front of the assembler at working height.

The next procedure is the green line assembly which consists of a series of progressive stations with an engine positioned in each. The Turbo Compound, previously mounted on a vertical rolling stand in green pre-line assembly, is now positioned over a powerized floor-type track conveyor, and is moved on a predetermined cycle. At these positions, all external parts are assembled (carburetor excepted), valves are set, and distributors timed. *(Continued on next page)*

Powerized conveyor lines move pistons and cylinders to engines for installation. The engine units are mounted on vertical rolling stands and clamped to machines which index the assembly so that cylinder mount surfaces to be worked on face the assembler. At the same time the machines rotate the engine propeller shafts to extend the connecting rods for installation of pistons.

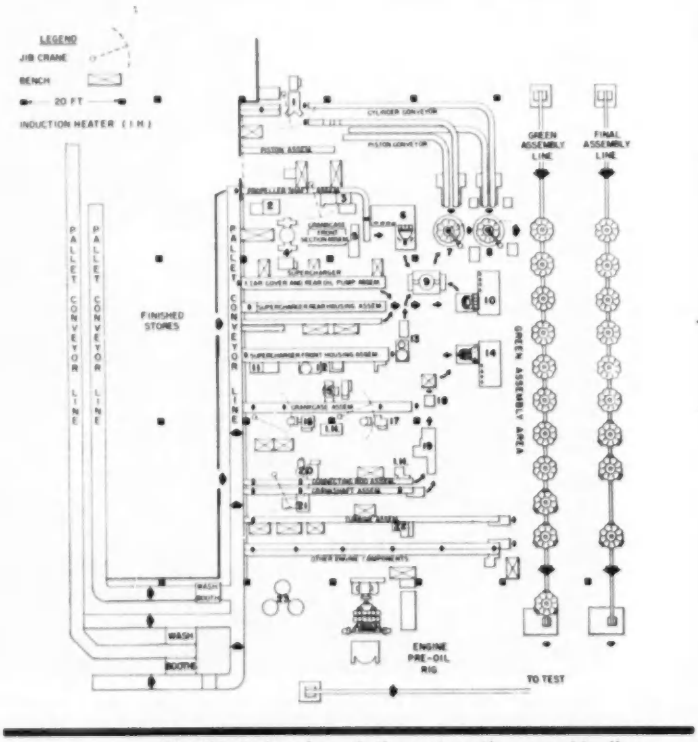
Oil flow rigs check proper lubrication and free oil flow through channels and engine bearings in the three major subassemblies — front, power and rear sections. Here a front section is shown in the rig.

When each engine has passed through all stations, it is weighed and advanced to engine pre-oil where it is rigged up to simulate actual running conditions. Instrumentation is available in the pre-oil rig for measuring internal friction at various places in the engine.

The engine is then removed from the vertical rolling stand and placed into a rolling stand equipped with a mount suitable for engine test. The carburetor is installed and the engine is washed, blown dry by air, and delivered to the test-preparation area where external test equipment such as fuel and oil lines, wires, starter and fuel pumps are attached.

Twelve test cells provide facilities for both green and final-assembled Turbo Compound engines. Each engine is run approximately 4½ hours during which time a run-in of new parts takes place, and carburetion, ignition, power output, vibration, fuel and oil consumption, leakage, and operating temperatures are checked.

After test completion, the engine is moved to the de-preparation area where test equipment is removed. It is then advanced to the transfer station. Here the oil is drained,



Simplified drawing of the automatic assembly line

carburetor removed, and the engine taken from the test stand. It is placed in a rolling stand and sent to engine disassembly.

At this point the engine is disassembled in a reverse manner to its assembly. Parts are removed, tagged, placed in protective-coated pallets, advanced through wash booths, blown dry, and advanced to the inspection area.

With inspection completed, the parts go through their proper stations to final assembly. Here the same methods, procedures, and sequences as used on the green bench and green assembly area are applied to reassemble the engine.

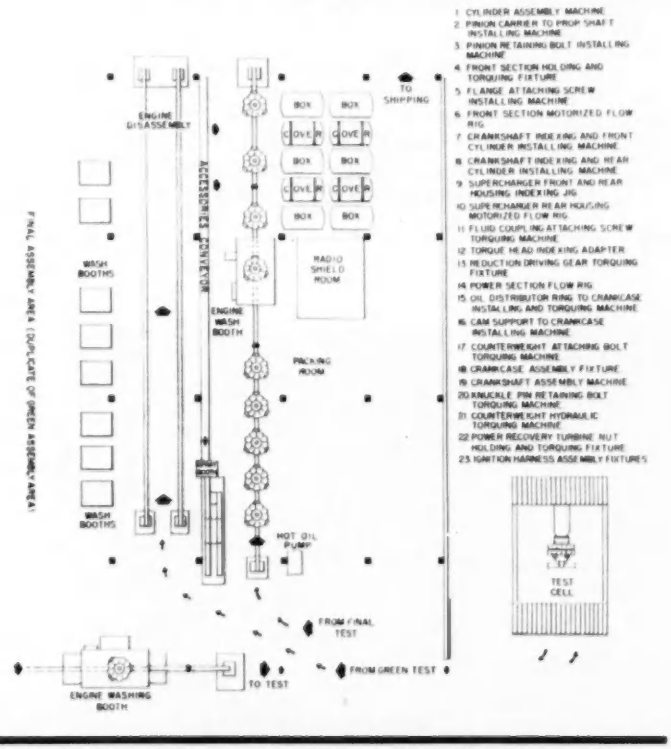
After final assembly, the engine proceeds through the same sequence of operations as followed from green assembly through final test where the engine is again tested for approximately 3½ hours.

Engine check and packing is the next step. After this check, every tenth engine is checked for radio interference.

All engines are then washed and prepared for placement in shipping containers. When the engine is installed in the container, the top is lowered into place and sealed. The container is then filled with dehydrated air to a seven-pound pressure and moved to the Shipping Department.

ENGINE ASSEMBLY STATIONS

Green bench assembly
Green pre-line assembly
Green line assembly
Green test preparation
Green test
Green test de-preparation
Engine disassembly
Parts inspection after disassembly
Final assembly
Final test preparation
Final test
Final de-preparation
Engine check and packing


1. CYLINDER ASSEMBLY MACHINE
2. PINION CARRIER TO PROP SHAFT INSTALLING MACHINE
3. PINION RETAINING BOLT INSTALLING MACHINE
4. FRONT SECTION HOLDING AND TORQUING FIXTURE
5. FLANGE ATTACHING SCREW INSTALLING MACHINE
6. FRONT SECTION MOTORIZED FLOW RIG
7. CRANKSHAFT INDEXING AND FRONT CYLINDER INSTALLING MACHINE
8. CRANKSHAFT INDEXING AND REAR CYLINDER INSTALLING MACHINE
9. SUPERCHARGER FRONT AND REAR HOUSING INDEXING JIG
10. SUPERCHARGER REAR HOUSING MOTORIZED FLOW RIG
11. FLUID COUPLING ATTACHING SCREW TORQUING MACHINE
12. TORQUE HEAD INDEXING ADAPTER
13. REDUCTION DRIVING GEAR TORQUING FIXTURE
14. POWER SECTION FLOW RIG
15. OIL DISTRIBUTOR RING TO CRANKCASE INSTALLING AND TORQUING MACHINE
16. CAM SUPPORT TO CRANKCASE INSTALLING MACHINE
17. COUNTERWEIGHT ATTACHING BOLT TORQUING MACHINE
18. CRANKCASE ASSEMBLY FIXTURE
19. CRANKSHAFT ASSEMBLY MACHINE
20. KNUCKLE PIN RETAINING BOLT TORQUING MACHINE
21. COUNTERWEIGHT HYDRAULIC TORQUING MACHINE
22. POWER RECOVERY TURBINE NUT HOLDING AND TORQUING FIXTURE
23. IGNITION HARNESS ASSEMBLY FIXTURES
ENGINE DISASSEMBLY
ACCESSORIES ASSEMBLY
FINAL ASSEMBLY AREA (INCLUDES GREEN ASSEMBLY AREA)
WASH BOOTHS
ENGINE WASH BOOTH
PACKING ROOM
RADIO SHIELD ROOM
TO SHIPPING
HOT OIL PUMP
TEST CELL
FROM FINAL TEST
FROM GREEN TEST
TO TEST
ENGINE WASHING BOOTH

showing the principal machines and assembly stations

Increasing Use of Tin-Zinc Plating

Since its development during World War II, tin-zinc alloy electroplate has found increasing usefulness. This one-bath process costs a little more than zinc plating and a little less than plating with tin.

Anodes are cast in alloy of the same composition as the electroplate, 75 per cent tin, 25 per cent zinc. The bath is a hot alkaline solution containing sodium stannate and sodium zinc cyanide. No difficulties are experienced in maintaining the proper concentrations in the bath during daily working over several years. In Europe the majority of baths are operated with sodium hydroxide and sodium stannate, but in the United States much faster rates of deposition are claimed by the use of potassium salts instead.

The proportions of tin to zinc are not critical for the corrosion resistance of the parts plated and variation of as much as five per cent up or down in the proportions of the two metals in the deposit is of no practical consequence.

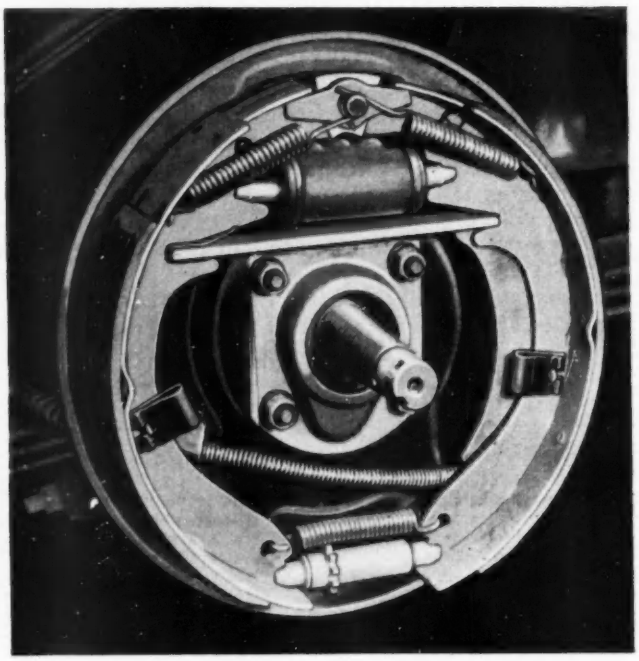
On electronic equipment it is common practice to apply not less than 0.0003 in. while for outdoor applications and equipment for severe conditions, up to 0.001 in. may be needed. As deposited the coating is very light in tone and being matt is liable to show finger prints unless it is treated in some way. Passivation for a few seconds in chromic acid is helpful, or parts may be spray-lacquered or scratch-brushed with great advantage. Polishing is very readily done and can produce a finish of very high lustre, but one which dulls in a few months in the ordinary atmosphere.

A number of tin-zinc plating plants are known to have been installed in the last year or two during the rearmament program which ensued upon the outbreak of fighting in Korea. Many firms have found the process simple to operate and trouble-free and have satisfied themselves that the coating does all that is claimed. In England in the last year or so tin-zinc plants have been installed for the plating of complete sets of components for undercarriages of aircraft. Aircraft control equipment is also being done in tin-zinc and the automobile industries are using this plating for hydraulic brake systems, and parts of electrical equipment. Practically all these parts are eventually painted and it is found that the adhesion of paints is entirely satisfactory.

—Tin Research Institute.

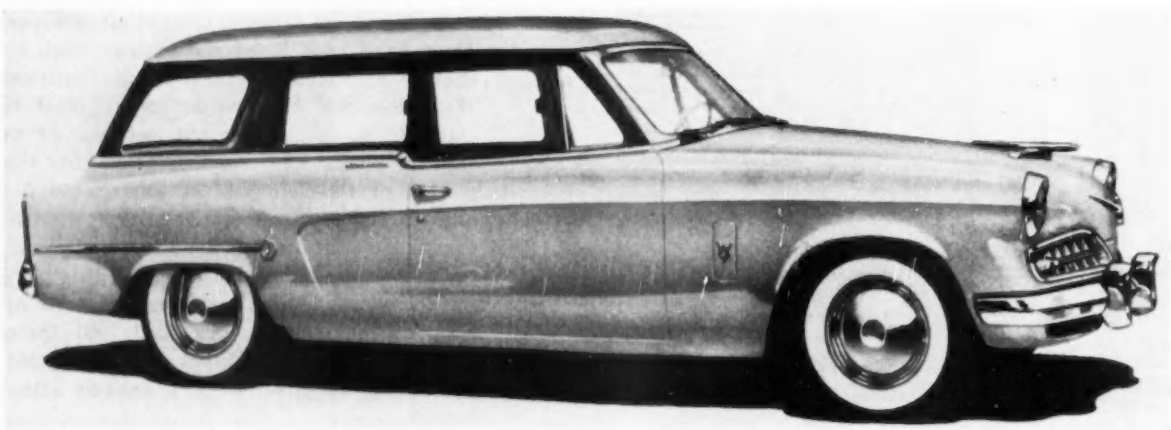
Studebaker Introduces New Brakes for 1954

Only Single Adjustment Required for Self-Energizing, Self-Centering Brakes. Champion Automatic Transmission Now Has Three Automatic Ratios in Drive Range.



Studebaker brake assembly in place, showing self-centering device at top, and adjustment nut at bottom. Self-centering is accomplished by brake shoe working against keystone shaped block.

FOR 1954 Studebaker Corp. offers a full line of 20 body types including: two- and four-door sedans, hardtop convertibles, coupes, Land Cruiser, and a new Conestoga station wagon. Some important engineering improvements as well as novelties in styling and interior decoration are among the outstanding features



The Conestoga all-steel station wagon.

of the new line. Tinted glass is available at extra cost; and the Saginaw integral type hydraulic power steering continues as optional equipment on all models.

Perhaps the major story from the standpoint of mechanical improvement is found in the introduction of a new type of self-energizing and self-centering brake system, developed cooperatively by Studebaker and the Wagner Electric Corp., on Commander and Champion models. According to intensive testing, these brakes provide up to one-third greater braking power, increased pedal reserve upon repeated stops from high speeds, and greater stability of action under conditions ordinarily leading to fading.

Front brakes on the Champion have been increased from 9-in. to 10-in. in diameter. The 11-in. front brakes on Commander are increased in width by ¼-in.; while rear brakes have been boosted to 10-in. in diameter. In addition, brake drum ring sections have been thickened by 35 per cent and have been altered to provide for a labyrinth seal design, more effective in keeping out road splash and dirt.

Self-centering action is achieved by a keystone-shaped anchor block against which the upper ends of the floating brake shoes rest. Manual adjustment for toe and heel contact has been eliminated while maintenance and periodic adjustments have been greatly simplified with only a single adjustment point required at each wheel.

Automatic transmissions on Champion now have three automatic speed ranges in drive range, initial starting being handled with an automatic low gear providing a starting ratio of 2.31 to 1. Incident to this change in transmission control, the Champion transmission features a new type of free-wheel unit, having improved sprag shape, and employing a double-cage arrangement which has the effect of actuating all sprags simultaneously, thus providing for greater load-carrying capacity.

Acceleration and performance have been improved on both Champion and Commander models by increasing compression ratio to 7.5 to 1 on both engines. Although advertised horsepower ratings have not been changed thereby, the Commander now is considered to be very conservatively rated.

H-11 spark plugs now are standard on Commander V-8's. Throttle linkage on Commander engines has been improved. On the Champion the carburetor idling system and accelerating pump have been modified to effect improvement in fuel economy.

Both Commander and Champion models have a new type clutch linkage when overdrive is specified, incorporating a flexible mounting member to accommodate for misalignment. In addition, there is a new type clutch damper on the Champion.

On all cars equipped with automatic transmissions the propeller shaft is fitted with a paper tube inserted in the ID to afford sound damping.

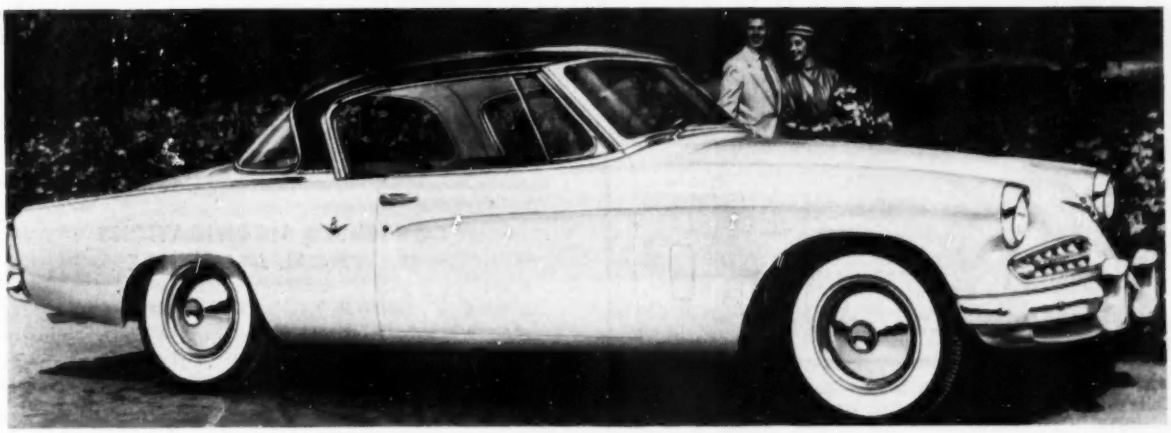
Rear axle ratio on Commanders squipped with overdrive now is 4.27 to 1; while a 4.09 to 1 axle is used with conventional transmission. Commander overdrive now is governed to come in at 25 mph.

New radiator cores and changes in the design and pitch of fans provide for even more cooling capacity. Shock absorber valving has modified to effect a softer ride at low speeds. The tailpipe has been redesigned on all models and provided with a[4] flexible type of mounting.

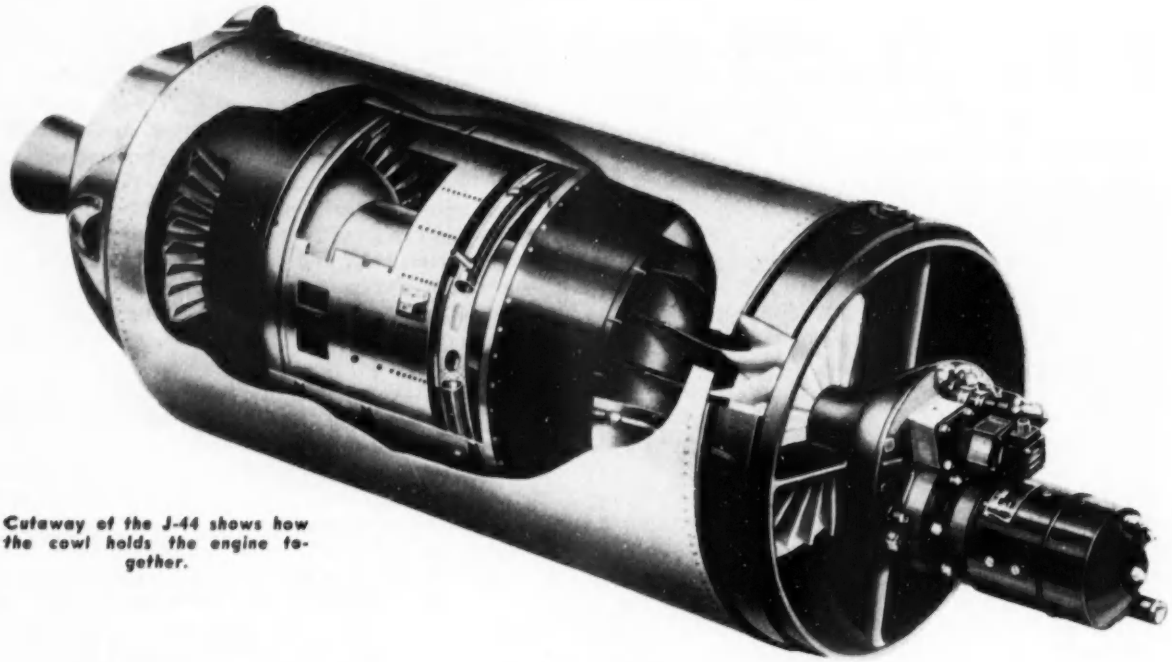
The engine rear support cross-member—on all two- and four-door sedan frames—has been given additional torsional rigidity by extending it so as to support the body at outrigger sections. On these sedan models the rear spring mounting is ¾-in. lower on Commanders; and ¾-in. lower both front and rear on Champions.

The new Conestoga station wagon, available in both Commander and Champion models, offers a choice of three transmissions—conventional, automatic, and overdrive—the latter two being available at extra cost. Power steering also is available at extra cost. One of the interesting features is the provision of two-stage rear springs to effect a better ride regard-

(*Turn to page* 102, *please*)



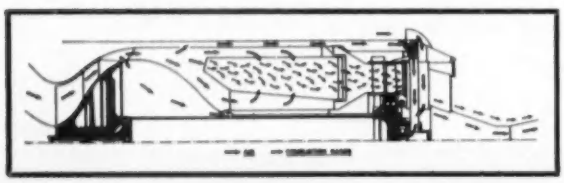
Commander Starliner hardtop convertible, a new sports car for 1954.



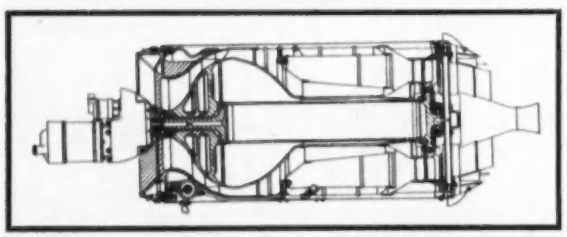
Cutaway of the J-44 shows how the cowl holds the engine together.

CONSTRUCTION details of the J-44 turbojet engine, first announced publicly last February, have just been released. This small powerplant for both guided missiles and non-expendable applications was developed by Fairchild Engine and Airplane Corp. at the Engine Div., Farmingdale, L. I.

Simplicity of design, for low cost volume production in sheet metal shops in an emergency, keynotes this engine. About two-thirds of the material required is sheet and strip, largely low carbon steel. In the current design less than 15 per cent is forged or cast, and even this quantity is being reduced in future production models. Overall conversion loss of the raw material is less than 20 per cent.



Cooling air bled from the diffuser flows between the cowl and combustion chamber shroud, also between inner shroud and main shaft. Additional air cools turbine blade roots, and rear bearing cage.



Simplified construction is shown in this longitudinal sectional drawing. With only two main bearings, a large-diameter, light-weight shaft can be used without a flexible coupling.

Design of the J-44 engine features a mixed flow compressor; air enters and leaves a centrifugal impeller axially. This gives a high air handling ability in a small diameter. Pressure ratio can be increased by modifying the compressor, or a second stage may be added. Now used as the powerplant for the Ryan Firebee recoverable target drone, and for other missiles, the J-44 design could increase takeoff performance of transport aircraft.

Backbone of the structure is the sheet metal cowl, which can be used as an integral part of the airframe, supported from the front end only if desired. It is rolled from flat aluminum or low grade stainless steel with formed rings riveted to the ends. The exhaust nozzle assembly, which is the rear bearing support member attached to the cowl, is fabricated from rolled and spun stainless sheet parts welded together. No special equipment is required, as the structural parts are made in braking operations.

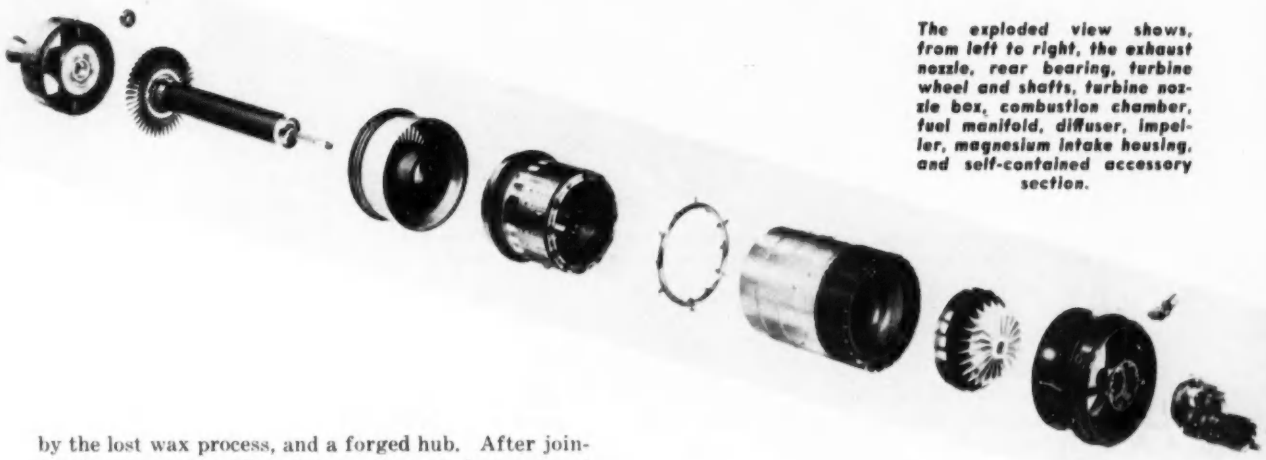
The turbine wheel assembly consists of blades cast

CONDENSED SPECIFICATIONS OF TYPICAL J-44 ENGINE

Thrust	1000 lb	Fuel consumption	1.65 lb/hr/lb thrust
Engine Speed	15,780 rpm		
Pressure ratio	2.5 to 1	Diameter	22 in.
Air flow	25 lb/sec	Length	72 in.
Gas temperature	1500 F	Weight	300 lb

Novel Jet Engine Is Designed for Production

Low Cost Production Was Guiding Factor in Designing the Fairchild J-44 Engine, Last of Pre-Korea Turbojets to Be Declassified. A Monocoque Sheet Metal Outer Cowl Supports the Entire Structure, Eliminating Many Usual Rigid Frames and Housings.



The exploded view shows, from left to right, the exhaust nozzle, rear bearing, turbine wheel and shafts, turbine nozzle box, combustion chamber, fuel manifold, diffuser, impeller, magnesium intake housing, and self-contained accessory section.

by the lost wax process, and a forged hub. After joining in a heated welding fixture, the unit is faced and given the briefest grinding operation. The lightweight, large-diameter turbine shaft is a pierced forging. It is finished on a high speed lathe and cylindrical grinder. To it attaches the compressor shaft, a simple upset forging. Fourteen spun rings make up the cartridge-type turbine nozzle box assembly, which consists of welded subassemblies bolted together for inexpensive replacement of burned out parts. The combustion chamber inner and outer shells are perforated in the flat sheet state, bead rolled and seam welded. The fuel manifold is a simple rolled tube to which are attached a dozen standard commercial oil burner nozzles costing 70¢ each.

The combustion chamber housing is part of the diffuser assembly. It is made from low temperature stainless steel with holes stamped in the flat, and rolled into shape. The two inner stovepipe-like tubes are Cherry-riveted to the magnesium diffuser casting. No special processing is required for the air passages. The angle of attack and blade finish are held only to acceptable sand casting tolerances, and only the casting fins are removed. The impeller now is assembled of magnesium and aluminum castings held together by a shrink-fitted shaft. The plaster cast finish is given a final cut to mate the two magnesium circumferences on a Cincinnati contour milling machine.

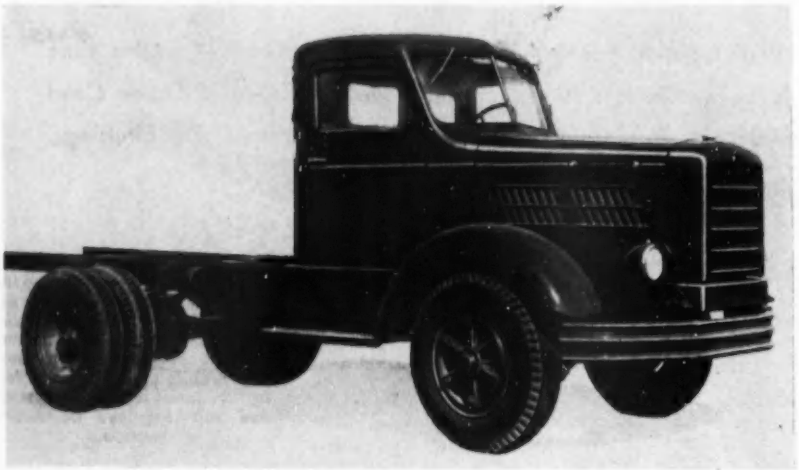
High temperatures normally associated with many points in a jet engine are avoided by the unique use of cooling air. No insulating blankets are needed. A design feature is the self-contained accessory section bolted to the compressor housing. This housing is also the oil tank, and no oil pump is needed as the tank is pressurized by ram air.

Following years of prototype and limited output, the J-44 is about to go into production of some four models at several times the current rate. New equipment—brakes, rolls and spinning lathes—to do most of the sheet metal work at Fairchild is said to have cost less than a quarter of a million dollars.

Low cost production, for either limited or heavy volume, is possible because of the low material conversion loss, the minimum amount of machining required, the semi-skilled labor needed for 90 per cent of the job, and the non-strategic materials used. Large forgings are eliminated, and the stamping, forming, and automatic welding processes are easily sub-contracted.

The designers envision a simple conversion job for civilian industries should they be called upon to mass-produce the J-44.

FWD Has New Line of Trucks for 1954



A blunt front end and clear frame back of cab are among the features of the new line. New hood design provides greater accessibility to the engine compartment.

A COMPLETE new line of four and six wheel drive trucks has been announced by The Four Wheel Drive Auto. Co. Labelled the Fourmasters (four-wheel drive) and the Sixmasters (six-wheel drive), the new models feature maximum interchangeability of major components, 12-volt electrical systems, valve-in-head engines, new profile, improved engine accessibility and a redesigned cab.

Gross vehicle ratings range from 14,500 lb to 50,000 lb in the four-wheel series and 30,000 lb to 60,000 lb in the six-wheel series, with Diesel engines available for all except the 14,500 lb model. All except the 14,500 lb model have 12-volt electrical systems, while the larger Diesels have 24-volt starting systems.

Waukesha engines have Stellite faced exhaust valve inserts and aluminum alloy pistons. All but the lightest model have a seven-bearing crankshaft.

Front skirting has been entirely eliminated on the new models, providing ample opening along the front and side of the frame for mounting snow plows, underbody blades, and other equipment. The radiator grill has been designed to take the shutter panel so that it becomes part of the design. The blunt front end permits taking full advantage of state laws regulating weight by certain axle-to-front-end and overall dimensions. The frame is clear back of the cab and no components extend above the top edge.

All frames in the new line are alloy steel heat-treated to obtain 25 per cent greater strength. The front end taper is changed to provide a greater depth of section (6 in.) thus producing a more rigid and simplified front frame area for the mounting of snow plows and other equipment. Frame crossmembers are of heavy - duty channel type front and rear with extended triangular gusseting into the side channels to provide longitudinal stability. FWD's new frame is said to combine the outstanding advantages of the "X" and ladder type frames.

The new full floating rear axle is said to be 30 per cent stronger. Axle shaft diameter has been increased from 1.812 in. to two in. This is an entirely new heavier duty rear axle being used in the 17,000 to 28,000 GVW models in the Fourmaster Series and in the 30,000 to 40,000 models in the Sixmaster Series. This new axle has a heavier duty ring gear and pinion and center differential assembly with a 25 per cent greater strength factor. This axle utilizes the "H" series outer ends and the YU center assembly, and was introduced to solve the problem of rating the former "H" series trucks in the 26,000 GVW range.

A power proportioning center differential is available on all except the 14,500 lb model. This unit is said to provide power to all wheels properly proportioned to weight distribution for maximum tractive effort and performance at minimum operating cost. All are equipped with a manually-controlled power-activated center differential lock with a red warning light on the dash to warn the driver when the lock is in operation.

The new all-steel cab is three-point rubber mounted. Pedals are suspended and provide stirrup type actuation. The clutch is hydraulically actuated, and the clutch and brake master cylinders are mounted on the firewall. The Orschlein parking brake handle permits the driver to take up slack on the parking brake from the cab. The cab, hood and trunnion-mounted radiator oscillate as a unit.

Power steering is optional on all except the two lightest models. All units have standard heavy duty steering gear and linkage. Radiator caps are now outside, accessible for filling or checking the radiator. An ICC-approved fuel tank is mounted on the left outside the cab. It has a recessed design to provide the first step into the cab.

Front springs have been lengthened to improve the rideability and steering geometry. An ex-bow is tied in with the spring mounting brackets to provide greater frame strength. Heat-treated alloy steel front bumpers are said to be 25 per cent stronger.

New Nash Rambler Sedan on 108-Inch Wheelbase

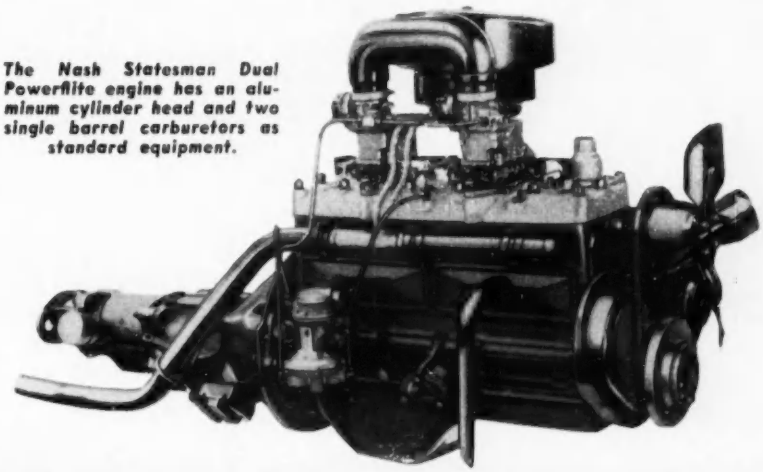
THE 1954 line of passenger cars offered by Nash Motors is highlighted by a new 108-in. wheelbase Rambler four-door sedan. The entire line, which again features the continental styling of Pinin Farina, includes the Ambassador and Statesman two- and four-door super sedans, and custom four-door and Country Club hardtop models; the new 108-in. wheelbase Rambler custom four-door sedan; and the 100-in. wheelbase Rambler custom series, including convertible, station wagon, Country Club hardtop, and the super Country Club hardtop.

The completely new 1954 Nash Rambler four-door sedan is a compact custom car on a 108-in. wheelbase. Overall length of the new model has been increased by eight in. and now totals 193⅜ in. This increase provides ample rear entrance room and rear legroom, in addition to increasing the cubic capacity of the luggage compartment.

The continental rear tire mount, standard equipment on the Rambler four-door sedan, carries the spare tire behind the rear deck, allowing greater roominess in the luggage compartment. The one-piece curved windshield has an area of five sq ft, and the wrap-around rear window has six sq ft.

The new Rambler four-door sedan is powered by the improved six-cylinder L-head Super Flying Scot engine, developing 90 hp. It has a compression ratio

(*Turn to page* 100, *please*)



The Nash Statesman Dual Powerflite engine has an aluminum cylinder head and two single barrel carburetors as standard equipment.

New Nash Rambler four-door sedan.

Numerous Sports Models at London Motor Show

LONDON, ENGLAND

THE 38th International Motor Exhibition, held at London late in October, again showed ample proof of the strong competition which now exists between the different national automobile industries of Europe. Among the many passenger vehicle makes shown, 31 were of British origin, 18 represented the entire American (including Canadian) industry, six makes came from France, Germany was stronger than before in London with five makes, Italy had three and Spain one make. The exhibits included a section of British-made racing cars, among them the Connaught single-seater with American Stuart Hillborn fuel injection, and a large number of competition and special vehicles such as the Lincoln X100, the actual race-winning Jaguar of Le Mans 1953 and others.

The British automobile industry has now successfully overcome the difficulties of the last few years such as scarcity of steel, unsatisfactory allocations of cars for the home market and fuel of low octane rating. Although the average age of cars registered in Great Britain is still excessively high, the trade conditions are rapidly changing towards a buyers' market. Production figures for 1953 showed a definite rise after they had dropped from 522,515 units in 1950 to 448,000 in 1952. Export returns indicate a drop of approximately 10 per cent from 1952 to 1953, although the U.S.A., England's best customer after Australia, bought 22,017 cars during the first nine months of this year against 21,741 cars during the equivalent period of 1952.

Although various British firms had already shown their 1954 models at the Paris Salon (see AUTOMOTIVE INDUSTRIES, Nov. 15), a number of them held their new cars back for the Earls Court show. Most of them belong in the specialist or sports car class, and it is

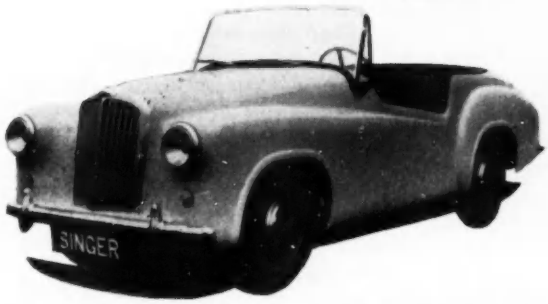
Small Cars Are Staging a Comeback Due to Changed Market Conditions

By
Robert Braunschweig

Bristol 404 sports coupe.

Photos by H. R. Clayton

Riley Pathfinder which supersedes the 2.5 litre model.



Singer SMX roadster with glass reinforced plastic body. This model is for export only.

noteworthy that never before has so much stress been laid upon performance and sheer speed. The principal new models were the Riley Pathfinder of the Nuffield Group, successor to the former 2.5 liter, a new 1.5 liter MG Magnette five passenger sedan, a new Jowett Jupiter R4 sports roadster with a body partially made of plastic, a Singer and a Jensen using similar material for the body, new engines for the Rover, a Daimler 2½ liter roadster and a sports two passenger by A.C. Many other models show various modifications.

For the first time since before World War II small cars were stealing the show at a London automobile exhibition. The new Ford Anglia and Prefect and the Standard Eight described in the Paris Show report find themselves confronted by a new and lower priced two-door edition of the small Austin A30, the very inexpensive Ford Popular — a slightly modified version of the previous Ford Anglia export model with a 10 hp (British) engine, the well-known Morris Minor and continental small cars such as the Citroen 2 CV, the Renault 4 CV and the German Volkswagen. The latter cars do not stand a good chance of sales in comparison with the lower-priced English small cars as shown by the following table:

Ford Popular two-door	£275
Austin A30 Seven two-door	£335
Standard Eight four-door	£339*
Austin A30 four-door	£355
Ford New Anglia two-door	£360
Morris Minor two-door	£373*
Ford New Prefect four-door	£395
Morris Minor four-door	£395*
Citroen 2 CV four-door	£398
Renault 4 CV	£430*
Volkswagen two-door	£458*

* Least expensive of several versions.

The comeback of the small British car is due to two reasons. During the government-enforced export drive of the immediate postwar years English designers tried to cater above all to overseas requirements and concentrated on medium-sized family cars with relatively large capacity engines. In later years, however, Continental small cars made such an inroad in various export markets as to induce British manufacturers to resume production of very small vehicles, one of their pre-war specialties. On the other hand, the home market, to which a greater number of cars can now be allotted than during the austerity period, does not possess an unlimited capacity to absorb the compara-

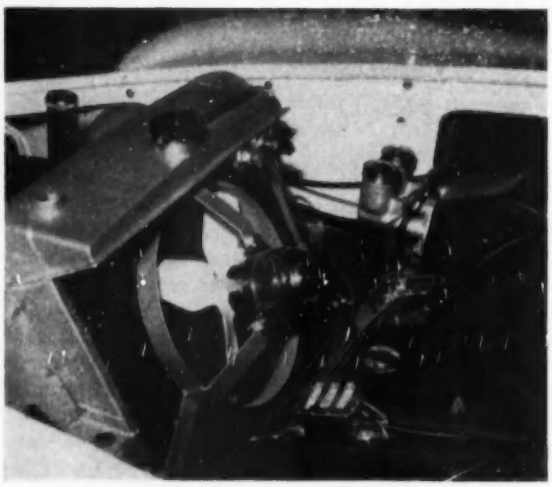
New Magnette four-door sedan.

Rover convertible coupe by Pinin Farina. It will go into production next year.

tively higher priced cars having medium overall size.

While the new Ford Anglia and Prefect, the Standard Eight and the Austin A30 Seven are of relatively or entirely new design, Britain's lowest-priced car, the Ford Popular, is a slightly altered version of the well-known Ford Anglia with the previous Prefect engine, a short two-door four passenger sedan with rigid axles and transverse springs fore and aft. The Popular has met with a great deal of interest in its native country at the new and reduced price which, even with the purchase tax of approximately 40 per cent, makes it one of the lowest-priced cars in the world.

Except for the very small cars little new was shown by the five important manufacturers. The Ford Consul and Zephyr, and the Dagenham-built cars show detail restyling such as chromium-plated window trim and waistlines. The Zodiac is a de luxe version of the Zephyr with two-tone coloring and additional equipment. Two-tone color schemes and more chromium trim were in evidence, no doubt as a result of study of American trends. Only very detailed alteration is apparent with the two Vauxhall models, the four cylinder Wyvern and the Velox-Six. The increase in engine compression ratio from 6.4 to 1 to 6.8 or optionally 7.4 to 1 is typical now that catalyst-cracked high octane fuel of premium rating is again available in Great Britain.



The cooling fan on the Jowett Jupiter R4 sports coupe is driven by an electric motor.

The Austin branch of the new big British Motor Corp. is not showing new models with the exception of a two-door version of its A30 small car, but the Nuffield organization, its sister group, has a number of novelties among its sports cars. An almost entirely new design is the Riley Pathfinder, the successor of the well-known 2.5-liter model. The large four-cylinder engine of 149 cu in. swept volume is retained, although its output is now announced as 102 to 110 bhp at 4500 rpm. The engine arrangement with hemispherical combustion chambers, inclined valves and two camshafts mounted high on the sides of the cylinder block is unaltered. The chassis frame has been entirely redesigned in order to serve as a stiff structure for the new all-steel body, and is composed of box-section longerons and several cross members. Instead of the previous rear axle suspension with semi-elliptic springs a new arrangement is used consisting of coil springs, a transverse Panhard rod for lateral stability and two torque arms reaching from the outer ends of the rear axle casings to two pivot points on one of the chassis cross members. Instead of the earlier rack-and-pinion steering, the cam type is now used. The hydraulic Girling brakes are of enlarged size and possess two trailing shoes at each front wheel. The higher pedal pressure is reduced by a vacuum servo unit.

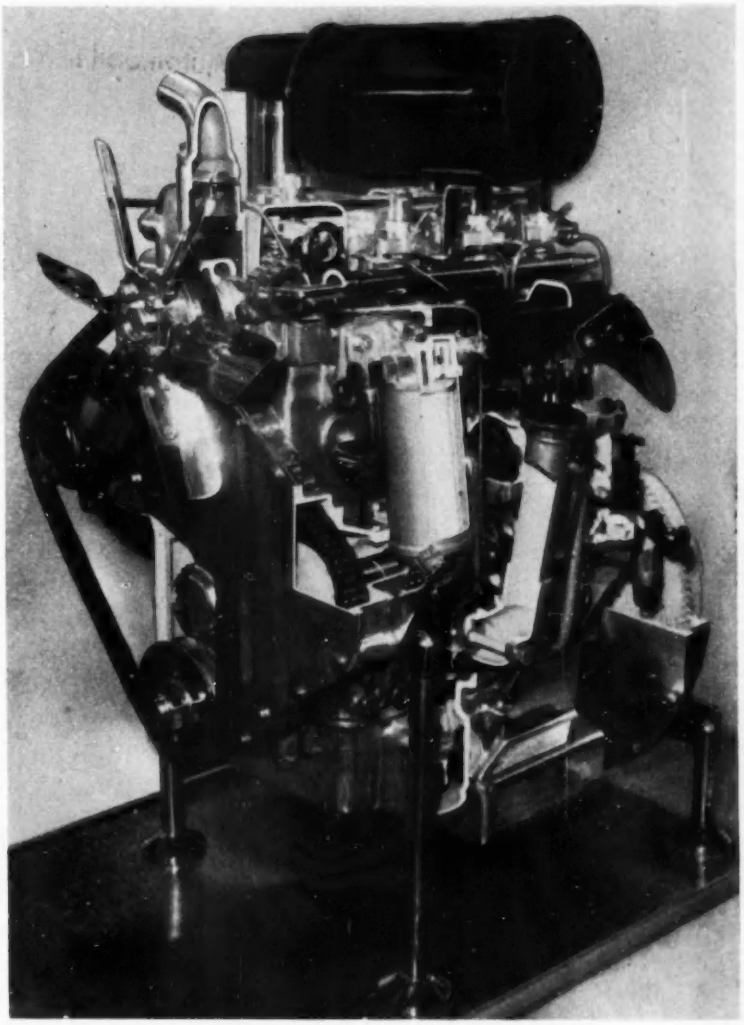
Another newcomer in the Nuffield group, the MG Magnette ZA resembles the Wolseley 4/44 shown for the first time 12 months ago except for the power unit which is entirely new. This is the first of a series

of three straightforward engine types with which the bulk of BMC cars will be equipped later on. This power unit closely follows current Austin practice with its push-rod operated overhead valves. With a bore of 73 mm (2.87 in.), a stroke of 89 mm (3.5 in.) and a piston displacement of 1.489 cc (90.83 cu. in.), the engine develops 60 bhp at 4600 rpm, maximum torque being delivered at 3000 rpm. Compression ratio is 7.15 to 1. Two inclined S.U. carburetors with a common air intake are used. The general design of this four passenger sedan follows previous Wolseley practice but an unusual feature is a central longitudinal arm supplementing the orthodox rear suspension. This is rigidly bolted to the final drive housing at its rear end, and connected to a pivot point of a transverse member of the body floor at its front. The two-passenger M.G. Midget sports car series TF differs from its predecessor, the TD, by a sloping hood line, a slightly curved radiator shell, a lower rear end and headlamps which are merged with the front fenders. The well-known 1.250 cc (76.25 cu in.) engine is now used in a form midway between the former TD version and the tuned Mark II. With compression ratio 8:1, output is 57.5 hp at 5500 rpm.

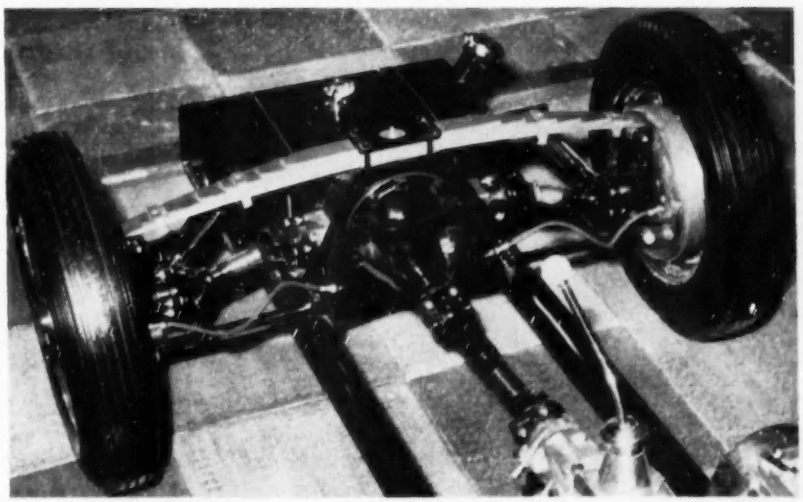
The remainder of the Nuffield range contains but little that is new. The small Morris Minor is now available as a quite roomy Traveller's Car, the British version of the station wagon.

The trend towards higher performance is personified by changes made to the Sunbeam-Talbot car and its Alpine two-passenger version. This was introduced some months ago, featuring modifications effected as a result of participation in the International Alpine Trial. Power output has been increased from 70 to 77 bhp at 4100 rpm, a commendable figure for the 2.267 cc (138.29 cu in.) four cylinder ohv engine. Still in the Rootes

(*Turn to page* 126)



Perkins P4 Diesel engine for passenger cars.



Independent rear suspension of AC Ace sports chassis.

This is one of the 1954 GMC COE models—the Diesel-powered DFW622-47A —with tandem axle drive.

New Features Added to GMC Trucks for 1954

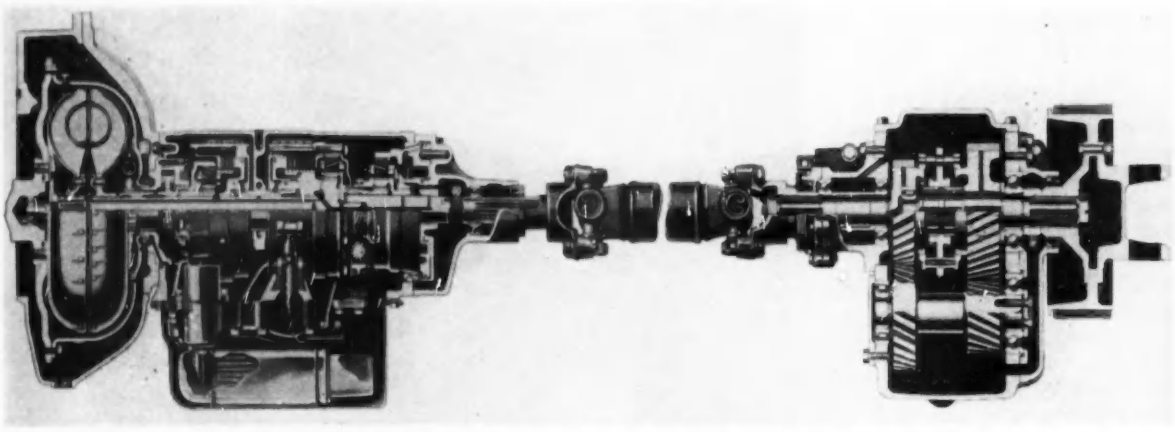
THE GMC Truck & Coach Div. of General Motors Corp. offers a comprehensive line of motor trucks for 1954, with some additional models, said to exhibit the greatest number of major product developments in GMC history. Eye appeal has been given a handsome lift, with complete restyling by Harley Earl, and a selection of 12 colors offered in five color combinations. A 125-hp engine has been introduced in light models, said to provide the highest horsepower rating heretofore available in this class of vehicles.

Hydra-Matic drive, first introduced in 1951 for light model trucks, now is available in four models of the medium- and heavy-duty line. It is a new eight-speed version of the truck type transmission, used in conjunction with a two-speed reduction unit, as illustrated. The unit is made available in the M350-24, two-ton; M400-27, which has a GCW rating of 30,000 lb; M450-30, with GCW of 38,000 lb; M450-30 six-wheeler, and M470-30, rated at 45,000 lb GCW. Another added H-M model is the one-ton package delivery truck.

Truck power steering applications have been extended, offering this option on models 350 and up.

To meet most economically the over-all length laws in all states, and to take advantage of longer trailer

(Turn to page 108, please)



For 1954 GMC is offering the eight-speed Hydra-Matic transmission drive line shown in cross-section here. The automatic transmission is used in combination with a two-speed gear box seen at the right.

Builders-Users of Aircraft Discuss Hydraulic Problems

By Joseph Geschelin

At right guests are shown inspecting a 70-hp. constant speed hydraulic drive for aircraft. Such a system will be used in a projected new transport plane.

THAT airframe manufacturers and airline operators are very much concerned with passenger safety on the sky lanes was demonstrated by the attendance of engineers and maintenance experts at the 1953 Transport Aircraft Hydraulic Conference, held in Detroit last month. The third Annual Conference, held under the auspices of Vickers, Inc., with Howard Pike, chief engineer, National Airlines as general chairman, proved to be one of the most unique undertakings found in automotive circles.

The two day meeting, which was arranged specifically to give airline operators as well as airframe manufacturers complete freedom to criticize the design and operation of the variety of hydraulic accessories used in modern transport planes, provided a forum for free discussion of troublesome problems and their solution. Even more impressive was the evidence of exchange of information and experiences among highly competing airline operations.

The 1953 conference was attended by some 90 people, including representatives from six airframe manufacturers and 19 airlines, including MATS. Vickers, the sponsor of the meeting, had a large group of engineers in attendance, thus was in position to answer the gamut of questions on every phase of the hydraulic system. Among the airline operators were representatives of foreign lines, including Air France, BOAC, South African Airways, Canadair, and Philippine Airlines. It is significant that the representative of BOAC flew in from London to attend the meeting while the Air France man came in directly from Paris.

To find a parallel for a meeting of this kind in automotive circles, one would have to visualize a conference organized by an engine or axle or transmission manufacturer who might invite his customers among the truck builders and fleet operators to sit in and take his product apart. It has not been done to our knowledge but it might be an excellent thing to try. For example, Vickers finds the conference exceptionally fruitful in bringing out in the open all troubles and complaints, thus having an unusual opportunity of studying field experience and using this as a tangible yardstick for improving the product.

Inasmuch as most of the discussion centered about specific accessories and individual parts, right down to the part number, it may not be of general interest to report the proceedings in detail. However, it is of interest to mention the range of subjects covered—fixed displacement pumps; variable displacement pumps; fixed displacement motors; valves; accumulators; seals; hydraulic fluids; hydraulic tube fittings;

(*Turn to page* 118, *please*)

The all-metal Piper Twin Apache which features unusually short take-off and landing performance

Piper's New Twin Engined Plane

In general configuration, size, weight and interior arrangements the recently-announced Piper Apache is similar to currently available four-place business aircraft of the larger category. Its useful load with full instrumentation, three radios, 72 gal of gas and four 170 lb passengers still permits 198 lb of baggage and other equipment.

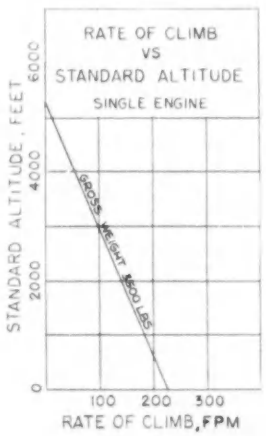
Maximum sea-level cruising speed is 160 mph, and the cruising speed at optimum altitude is 165 mph. The Apache has a single engine ceiling of 5000 ft with full gross load and 8000 ft with average flight load.

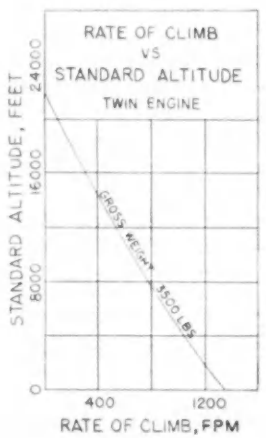
Several key design features contributed to the excellent single engine performance of the Apache. The Piper airfoil section—US35B modified—has been retained to provide high lift qualities, in a 37-ft span with 204 sq ft of area. The Lycoming four cylinder, 150 hp 320 cu in. engines which power the plane are equipped with constant speed, controllable full-feathering Hartzell metal propellers.

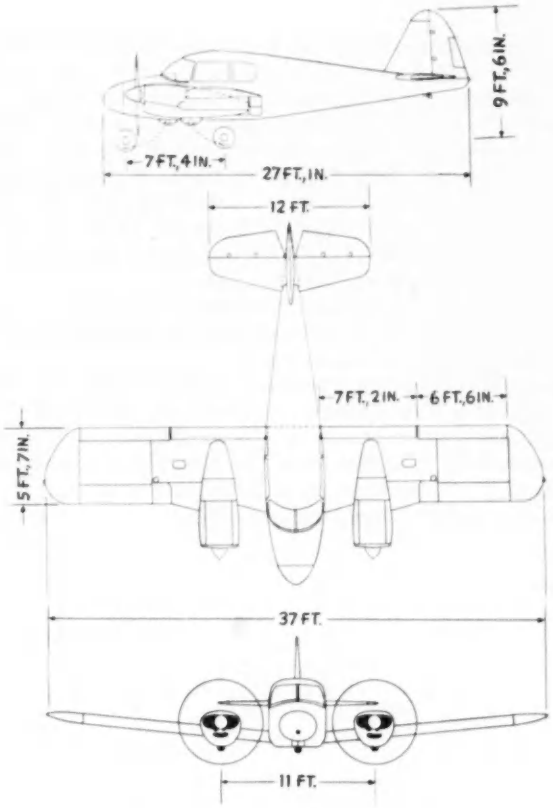
Empty weight of the plane is approximately 2170 lb, completely equipped with instruments, three radio sets, and other items normally considered as extra equipment. At the gross weight which results from adding the desired useful load to this empty weight, the above mentioned design features, coupled with general design cleanness, have made possible a single engine performance which more than meets the anticipated requirements.

The construction of the Apache is largely conventional sheet metal, simplified to a considerable degree to reduce manufacturing costs. The forward part of the fuselage from the tail cone to the nose wheel is reinforced with a steel tubing structure which withstands the high loads imposed on the center section region and provides an important safety factor in this critical area.

The rectangular plan form of the wing permits the







Principal dimensions of the new plane.

use of many interchangeable parts and has simplified construction. The wing structure consists of a massive stepped-down front spar, a rear spar, lateral stringers, ribs, stressed skin sections, and a readily detachable wing tip. The wings are attached to the tubular center section structure with fittings at the side and in the center of this structure, and the main spars are bolted to each other with high-strength butt fittings in the center of the fuselage, making in effect, a continuous front spar. This arrangement combines high strength and light weight characteristics, but still permits easy removal of the wings for dismantling purposes. Flush riveting is used in construction on the forward part of the wing and fuselage in those areas determined to be critical from the standpoint of drag created by standard rivet head projection. Elsewhere, universal-head rivets are used except where flush riveting can be done with automatic riveting machines, and in those places flush rivets are used.

Landing gear units on the Apache are produced for Piper by Electrol, Inc. Lowering and retracting of the landing gear is accomplished through hydraulic cylinders at each leg, actuated by hydraulic fluid pressure from the engine driven pump. Gear retraction takes about 11 sec.

In the event of hydraulic pump failure, hydraulic pressure for gear or flap operation can be obtained with the manual hydraulic pump located with the gear and flap controls on the control pedestal. If hydraulic pressure should be lost, the main gears will fall down automatically, with down locks holding the gears in place. The nose wheel can be pulled into the down position with a manual-extender control.

The exhaust system is a combination of the Piper-developed cross-over system and the exhaust augmenter arrangement. In the cross-over system exhaust gases are directed into stainless steel exhaust pipes crossing in front of the engine in a sequence which results in very effective scavenging of the gases from each cylinder, rather than an exhaust back pressure. The cross-over tubes empty into single exhaust augmenter tubes located on the outboard side of the engines underneath the wings, where exhaust noises are as remote as possible from the cabin area. Through the six in. augmenter tubes the cooling air for the engines is pumped by the jet action of the exhaust.

The Apache will be offered by the Piper Aircraft Corp. in three models: A Standard which will have no radio equipment and will be available for those who wish to make their own special radio installations; a Custom model, which will include the radio equipment expected to be needed and requested by most users; and a Super Custom model, which will also include an autopilot installation. In the Custom model will be installed a Lear ADF, a Narco omnigator for omni navigation and secondary communications, and a Narco Simplexer for primary communications. This combination will provide one L-F receiver and ADF, two VHF receivers, one with omni and the other with a tuning frequency locater, two VHF transmitters with a total of 20 channels, a marker beacon receiver, and an ILS runway localizer feature. Room for additional radio equipment, if it should be desired, has been provided in the instrument panel.

Standard equipment on all models will include a Southwind 18,000 Btu heater, incorporated in a heating-ventilating defrosting system with six outlets in the cabin.

• • •

Studebaker 1954 Prices Up; Higher Earnings Predicted

Factory list prices of 1954 Studebaker models will be raised $10 to $60 on Champion and Commander sedans, and $85 to $105 on its sports hardtop models and Land Cruiser four-door sedans. These figures were given recently by H. S. Vance, president of Studebaker Corp.

Mr. Vance also stated that he expects the company to show higher earnings in 1954 than in 1953, while producing a greater number of cars and trucks. He also mentioned the fact that Studebaker would complete work in the next few months on current defense contracts for the production of J-47 jet engines.

New ASLE Address

The American Society of Lubrication Engineers has announced a move to The Western Society of Engineers Building. It is located at 84 E. Randolph St., Chicago 1, Ill.

LATEST Diesel engine development, the application of engineering achievements in the passenger car field to commercial vehicles, and a survey of automobile octane requirements were some of the subjects discussed at the week-long triple SAE National Meetings held recently in Chicago. Engineers attending the Transportation, Diesel Engine, and Fuels and Lubricants sessions of the Society also attacked such problems as curbing exhaust noise, power steering for heavy duty vehicles, cab-over-engine design, and propane usage.

Featured at the outset of the technical sessions was the Transportation meeting where the first subject discussed was commercial suspension. H. E. Fox and D. J. LaBelle, GMC Truck & Coach Div., presented a paper on the air suspension system as used on GM buses (AUTOMOTIVE INDUSTRIES, Oct. 16, 1952). According to the authors of the paper, the suspension system has had more than a quarter-million miles of testing, much of it over rough block pavement, and has been successfully applied to eight different types of vehicles and trailers. It was stated, however, that while the system protects vehicles from damage by high-frequency vibrations, riding comfort remains a matter of personal opinion.

Concerning motor truck electrical development, J. H. Bolles, chief engineer, Delco-Remy Div., GMC, pointed out that the truck industry should take some advantage of the high production tooling of the 12 v passenger car equipment. He stated that 12 v equipment is very desirable on eight cylinder engines where the compression ratio is over 8 to 1 and the design is such that free breathing is obtained at high speeds. It was reported that the principal advantage of 12 v ignition is that it affords a larger safety factor between voltage required by the engine and voltage supplied from the ignition coil. This safety factor permits more miles on plugs before cleaning and resetting and also eliminates some missing on slightly fouled plugs, according to Mr. Bolles.

At the symposium on truck exhaust noise, it was brought out that barely two-thirds of human beings can agree on whether a truck is too noisy or on which noises are the worst. This was based on a statement by D. B. Callaway, Armour Research Foundation. It was explained by B. F. Jones, chief engineer, Autocar

HIGHLIGHTS

Commercial Ball Joint Possibilities

By James H. Booth,
Thompson Products, Inc.

THE ball joint suspension which has been applied recently to production in the passenger car field is receiving attention from manufacturers of commercial vehicles. Figure 1 shows a design where the front end load is carried almost entirely by the lower ball joint and the light load carrying arm is attached to the upper ball joint. The upper socket acts as a dampening member and carries a small component of the front end load. The lower stud is in tension, and steering motion is carried on the ring of balls between the races on the ball stud head and the spherical bearing. A flat surface on the ball stud in the upper socket acts as a clutch for dampening steering motion.

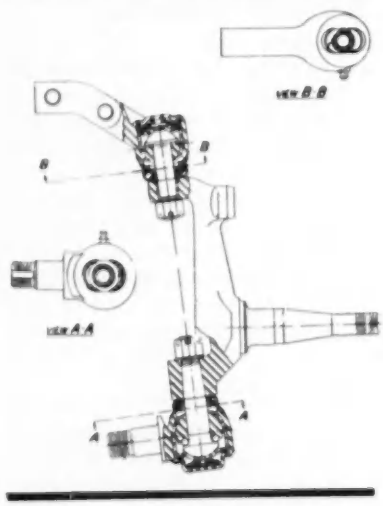


FIG. 1

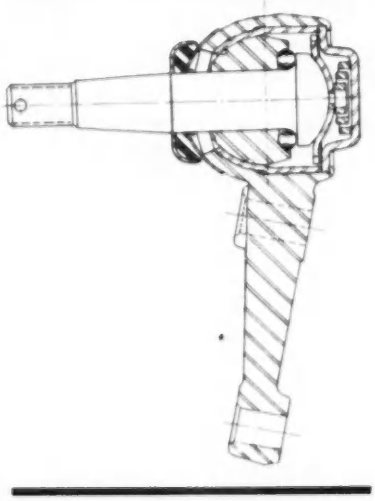


FIG. 2

Figure 2 shows the high load carrying lower ball joint. The forging, which is attached to the suspension arm, contains a hardened, stamped insert, which is knurled on the outer diameter to prevent turning. The outer surface of the spherical bearing is in contact with the hardened insert. Load is transmitted from the stud through the ring of balls to the spherical bearing, shell and forging. A seat urged by a spring and spun-in type closure plug complete the assembly in much the same way that a tie rod socket is assembled.

Angular movement of the suspension causes relative motion between the bearing and the shell, while rotation caused by steering is taken between the stud and the bearing on the ring of loose balls. The free turning of this ball bearing assembly provides no dampening to prevent wheelkick caused by the gyroscopic action of the front wheels in motion.

Div., White Motor Co., that when instrument readings are compared with human hearing, agreement between meters and ears in reached in barely 60 per cent of tests. There was some difference of opinion on the use of more silent mufflers. M. L. Fast, Cummins Engine Co., reported that the more effective truck mufflers may be in stifling exhaust noises, the more back pressure they exert on engines. On the other hand, R. L. Hardgrove, Liberty Highway Co., Toledo, an operator, stated a case history where back pressure was the same for both a noisy and more quiet muffler under the same conditions. In this case the back pressure measurement was on the order of 0.5 lb. Advocating larger mufflers to solve the problem, C. E. Nelson, president, Nelson Muffler Corp., Stoughton, Mis., contended that few vehicles have room for the bigger equipment.

At the Diesel engine meeting, engineers were told of two latest developments in powerplants. Bruno Loeffler, Mack Motor Truck Corp., described the latest Mack Deisel engine. This engine which utilizes a single lobe combustion chamber was reported in the July 1, 1953, issue of AUTOMOTIVE INDUSTRIES.

The other engine report concerned the Packard lightweight Diesels which were recently placed in production. Features of the engine include a turbosupercharger, four valves per cylinder, gear drives for all accessories with gearing located at the flywheel end, and the extensive use of aluminum to obtain weight reduction (AUTOMOTIVE INDUSTRIES, Sept. 1, 1952).

Improvements in the cold-starting characteristics of lubricants, and progress in oil filters, air cleaners, and automatic transmission oils, are among the technical jobs awaiting completion in the next 40 years, according to H. C. Mougey, Research Laboratories, GMC, who spoke at the meeting on fuels and lubricants.

# of Three SAE Meetings

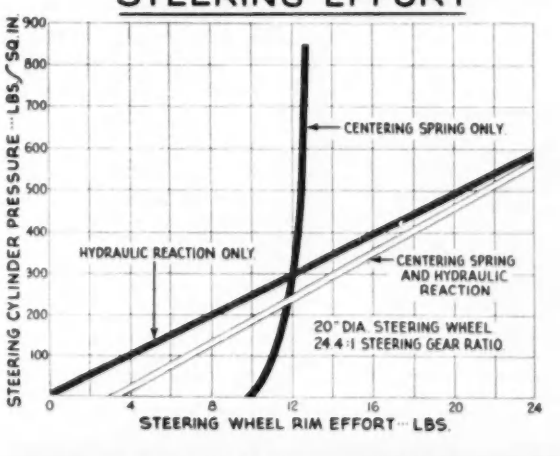
By Thomas Mac New

Rim Effort with Power Steering

By T. H. Thomas,
Bendix Products Div.,
Bendix Aviation Corp.

RELATION between power steering cylinder pressure and steering wheel rim effort, considering three types of systems: one using hydraulic reaction only, one using a centering spring only, and the third using centering spring and hydraulic reaction, is shown in Fig. 1. It will be noted that, in the system using hydraulic reaction only, the relation between cylinder pressure (which, to a certain extent, is a measure of the force being transmitted into the steering system) and the driver's effort on the steering wheel rim, is a uniform straight line. When a centering spring is used without hydraulic reaction the centering spring must take care of the whole job of returning the steering mechanism to center and providing the desired "feel of the road." Thus, it ordinarily must be a fairly heavy spring, requiring that considerable effort must be exerted on the steering wheel before the cylinder begins to do any work, as evidenced by an increase in cylinder pressure. When both centering spring and hydraulic reaction are used, the spring load can be lighter, and once that load has been overpowered, the straight line relationship between cylinder pressure and rim effort is again obtained.

FIG. 1



Effect of Transmission on Engine Knock

By H. W. Best, Yale University
Leonard Raymond, Socony Vacuum Oil Co., Inc.
R. K. Williams, Research Laboratories Div., G.M.C.

A Report of the CFR Motor Fuels Division of the Coordinating Research Council, Inc.

THE 1952 models of makes QM and QA were tested to determine the effect of one type of automatic transmission on fuel requirements. The cars differed only in that Car QM was equipped with a synchromesh transmission whereas Car QA employed a torque converter. A comparison of the distribution of maximum octane num-

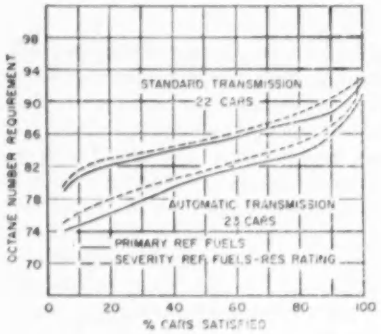


Fig. 1—Effect of automatic transmission on maximum fuel requirements.

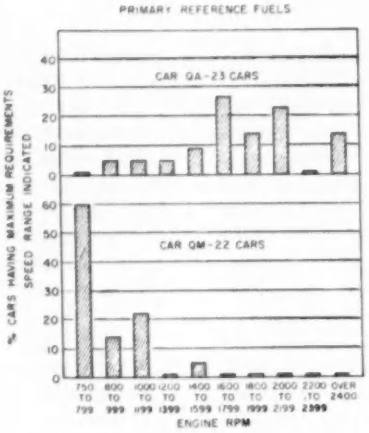


Fig. 2—Effect of transmission on speed of maximum knock. Car QA—automatic transmission; Car QM—conventional.

ber requirements for primary and severity reference fuels is shown in Fig. 1. The maximum requirements obtained with cars using the torque converter were approximately 4 octane numbers lower than those obtained on cars equipped with the synchromesh transmission. This probably is due to the fact that the torque converter transmission does not permit full throttle operation at low engine speeds where maximum knock occurs with the synchromesh transmission. The effect of the torque converter in increasing the speed of maximum knock is shown in Fig. 2.

Life of Diesel Exhaust Valves

By J. A. Newton, Chief Engineer,
Valve Div., Thompson Products, Inc.

J. L. Palmer, Head, Mechanical Testing Dept.,
Lubrizol Corp.

V. C. Reddy, Development Engineer,
Detroit Diesel Engine Div., GMC

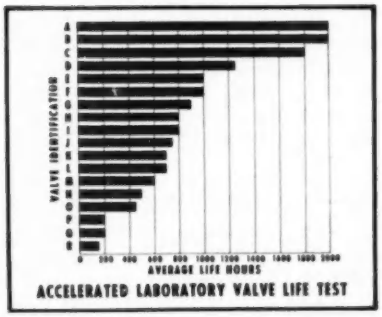
WHILE much can be done to improve valve performance in the laboratory bench test the ultimate answer must come from the engine. An accelerated laboratory engine valve test was developed during a program to evaluate the effect of cylinder block and cylinder head design changes on cylinder head gasket sealing. For this purpose a special test engine was set up in the laboratory of the Detroit Diesel Engine Division. This was a quad unit consisting of four 6-71 engines driving through a common gear box. To accelerate the test the compression ratio was increased two ratios, the camshaft advanced six degrees and the injectors timed with a 1.440 gage giving an additional 2½ degrees advance. The thermostats were removed and the engines run with as low coolant temperatures as possible. The engines were operated for 10 min at 500 rpm no load, and 10 min at wide open throttle, 2100 rpm with 90 mm injectors (approximately 235 hp). Indicator diagrams taken on the engine operating under these conditions showed peak combustion pressures exceeding 1750 psi. Early in the test program, it became apparent that exhaust valve failures could be produced in a relatively short time on these engines. As a result, an exhaust valve development program was carried on concurrently with the test of the cylinder heads and blocks for which the unit was originally intended (Fig. 1).

At the time the test originated, 45 deg valves were used in production. These were either unfaced GM N81940 or faced GM N81940. The unfaced valve failed in as little as 100 hr of test due to severe head distortion (cupping). The valves faced with GM 3544M failed by cracking radially. Tests of valves made of these same materials with 30 deg heads showed considerable improvement and all production valves were subsequently changed to this seat angle. In addition, a great many valves of various designs and materials have been tested on this setup. One of the materials that showed exceptional resistance to cracking was a jet turbine blade material known as N-155. This particular material was selected because it could be obtained in both the forged and the cast state and also had good strength at elevated temperatures. Many other alloys in this same category also possess these desirable characteristics and may prove even better than the N-155 material. Some of these are on test at the present time. However, the results with the N-155 valve were so superior to the production valve that it was adopted for production. For example the 30 deg unfaced valves of GM N81940 material failed in less than 200 hr while valves of the same material faced with GM 3544M failed by radial cracking in 600-800 hr, and N-155 valves operated satisfactorily for periods exceeding 2000 hr. In addition the hot hardness of the N-155 valve was sufficient to require no hard facing when used in high output heavy duty engines. Some of the other valves tested under the same conditions are shown in Fig. 1 in the order of their life under accelerated test conditions.

In another Diesel engine, road tests were made on valves from three materials which were thought to have desirable properties for extended

(*Turn to page* 110, *please*)

FIG. 1



ACCELERATED LABORATORY VALVE LIFE TEST

VALVE IDENTIFICATION CHART

SYMBOL	IDENTIFICATION
A	FORGED N155, 30° SEAT
B	FORGED N155, 45° SEAT
C	GMN81940, CROWNED HEAD, GM3544M FACING
D	GMN81940, MODIFIED, GM3544M FACING
E	CHROME - NICKEL - MANGANESE, UNFACED
F	GMN81940, MODIFIED, GM3544M FACING
G	CHROME - NICKEL - MANGANESE, 45° SEAT, FACED
H	GMN81940, HEAVY GM3544M FACING
I	GMN81940, HEAT TREATED, GM3544M FACING
J	CAST N155, 30° SEAT
K	GMN81940, HEAT TREATED
L	GMN81940, 30° SEAT, GM3544M FACING
M	GMN81940, 45° SEAT, GM3544M FACING
N	CAST NICKEL CHROMIUM ALLOY
O	CHROME - NICKEL - MANGANESE, 30° SEAT, UNFACED
P	GMN81940, 30° SEAT, UNFACED
Q	CHROME - NICKEL - MANGANESE, CALORIZED
R	GMN81940, 30° SEAT, UNFACED, ALDIP

USE SCHWITZER-CUMMINS DIESEL ENGINE EQUIPMENT

for Greater Operating Economy

BOOTH 26—ENGINEERING DISPLAY
January 11-15
SHERATON-CADILLAC HOTEL, DETROIT

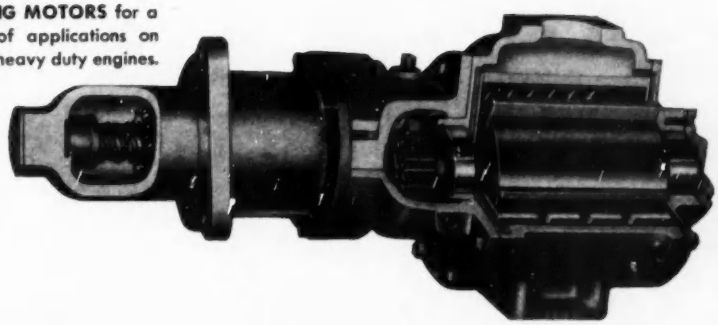
EXHAUST DRIVEN TURBOCHARGERS for engines from 70 to 200 HP.

All of our products for your Diesel engines are engineered for your particular application and requirements. More than one-third of a century of research, intensive engineering, broad field experience with unexcelled manufacturing facilities are back of our products. We gladly offer our engineering assistance and our extensive facilities to produce and serve you efficiently.

THERMOSTATICALLY CONTROLLED COOLING FANS AND FAN DRIVES. Available for installation by owner on many makes and sizes of heavy duty engines.

POSITIVE DISPLACEMENT SUPERCHARGERS for engine sizes from 50 to 500 HP and pressure ratios of 2:1 max.

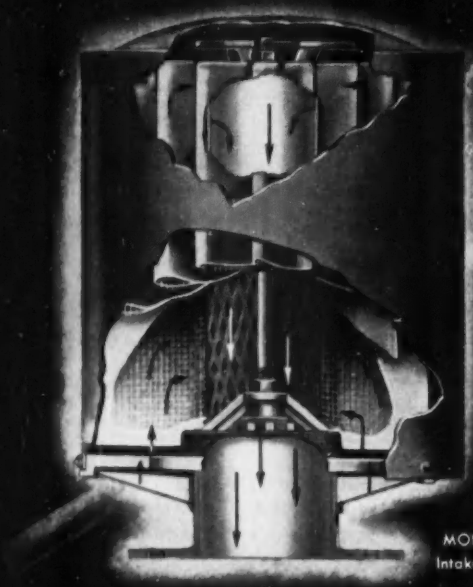
AIR STARTING MOTORS for a wide range of applications on many sizes of heavy duty engines.



- COOLING FANS
- OIL PUMPS
- WATER PUMPS
- CRANKSHAFT VIBRATION DAMPERS
- AUTOMATIC SHAFT SEALS
- PUMPS FOR AUTOMATIC TRANSMISSIONS AND POWER STEERING

SCHWITZER-CUMMINS COMPANY
1125 MASSACHUSETTS AVENUE
INDIANAPOLIS 7, INDIANA, U.S.A.

YOUR EQUIPMENT WILL LAST LONGER with STAYNEW INTAKE FILTERS!



MODEL D
Intake Filter

AND HERE'S WHY! Your equipment needs the protection Staynew Intake Filters are designed to give. Staynew Intake Filters stop the dust and dirt from entering through air intakes. Staynew's *Positive Protection* keeps shutdowns and repairs at an absolute minimum, actually lengthening equipment life. And Staynew itself requires less attention than ordinary intake filters, frequently operating two or more years *without maintenance.*

Write today for catalog S. I. F.

DOLLINGER Protects Motor STAYNEW FILTERS

Representatives in Principal Cities

DOLLINGER
CORPORATION
85 Centre Pk., Rochester 3, N. Y.

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

Wire wheel inserts are dressing up many of the 1953 models

—of course they're Stainless Steel

WIRE wheels are one of the "hot items" in the automotive trade this year. Car owners like the distinctive look they give, and they are available for almost any car in the form of inserts like the one shown here.

As on so many other decorative members, straight-chromium Type 430 Stainless Steel is being widely used for wire wheels. Stainless Steel is strong yet light in weight; it resists corrosion; it's easy to keep bright and new-looking.

These qualities of Stainless Steel—so popular with owners—are the main reason why there's more straight-chromium Stainless on the 1953 models than ever before.

New finishing facilities have helped to speed the switch to Stainless Steel for all types of exterior and interior trim. U·S·S 17 (Type 430) Stainless Steel, used extensively for these applications, is furnished in strip form with a bright mill finish that requires minimum polishing after forming, as well as in wire and other forms.

For the best performance, insist on U·S·S Stainless Steel. Our representatives will be glad to work with you in selection of materials and forming methods that best meet your design requirements.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

3-1605

UNITED STATES STEEL

ASK

BAIRD

ABOUT IT!

HIGH PRODUCTION TOOLING

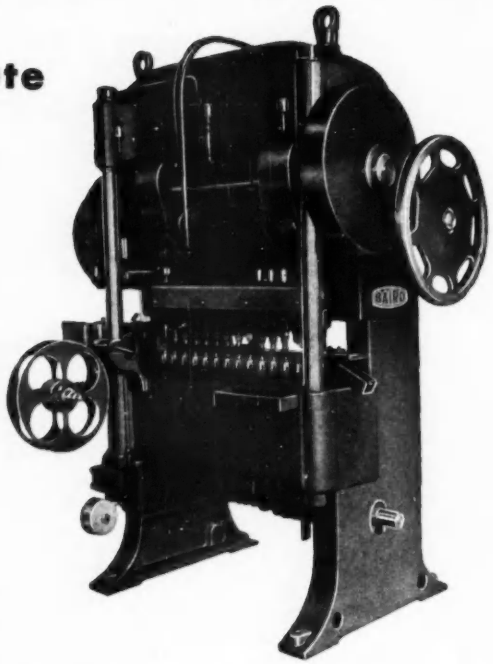
80 complete pieces per minute

FOR PROFITABLE PRODUCTION

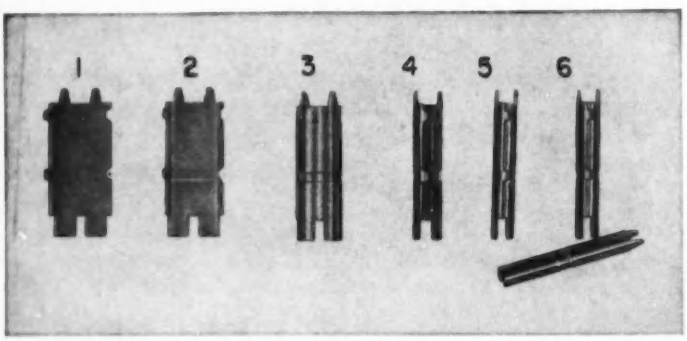
Here is low-cost, completely automatic production . . . typical of precision stamping that can be performed on the Baird Multiple Transfer Press.

For complicated work, with punch holders and die blocks . . . transfer slides and fingers . . . progressive operations through 14 stations, might include blanking, drawing, piercing, embossing, slitting, trimming, broaching, sizing, hexing, forming, inserting, and riveting. And tooling is easily replaceable for the work required.

There are 12 press sizes, taking automatically-fed coiled stock from 2½" to 4"; maximum feed length from 2" to 3½". For low-cost, volume production within its range, there's no more profitable automatic than the Baird Transfer Press. Bulletin on request.



BAIRD AUTOMATIC TRANSFER PRESS



Producing an electrical switch part

Here is a hollow shaft, used in an electrical switch, that is produced completely in a 6-station die set. At station No. 1, the part is blanked from flat stock. At No. 2, the outer edges are curled . . . and the remainder of the forming operations take place at stations No. 3, 4 and 5. Final sizing is performed at No. 6. This shaft is made in different lengths and variations, by means of interchangeable punches and dies. Production, 80 pieces per minute . . . 4800 per hour.

48A53

the BAIRD MACHINE COMPANY
STRATFORD • CONNECTICUT

EATON VALVES

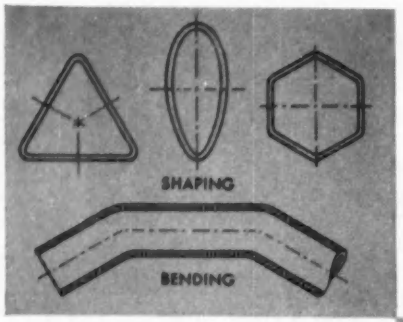
Longer Valve Life for ALL Engines in ALL Types of Service

EATON MANUFACTURING COMPANY

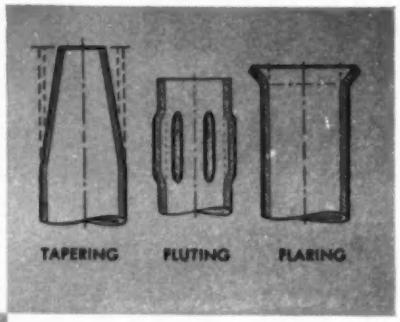
General Offices: CLEVELAND, OHIO

VALVE DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

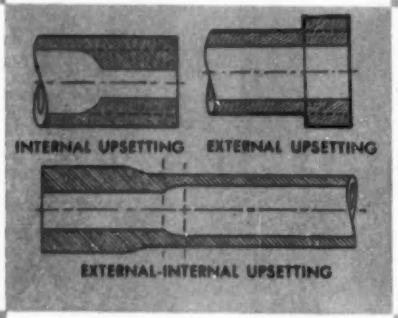
PRODUCTS: Sodium Cooled, Poppet, and Free Valves •Tappets •Hydraulic Valve Lifters •Valve Seat Inserts •Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings •Heater-Defroster Units •Snap Rings Springtites • Spring Washers • Cold Drawn Steel •Stampings •Leaf and Coil Springs •Dynamatic Drives, Brakes, Dynamometers



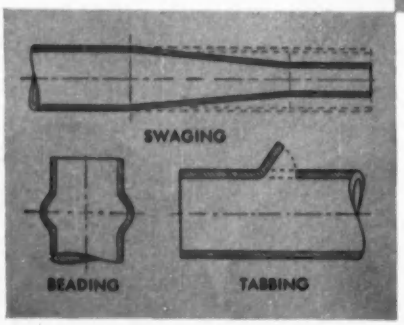
OSTUCO TUBING is versatile!



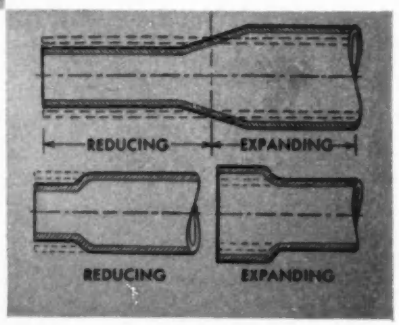
OSTUCO TUBING is versatile!



OSTUCO TUBING is versatile!



OSTUCO TUBING is versatile!



you draw the blueprint . . . we'll deliver the goods

There's practically no limit to the things OSTUCO can do with Seamless and Electric Welded Steel Tubing to help you produce lighter, stronger, better looking products at lower cost. Only a few of the operations are shown above.

Newly expanded and modernized facilities for *manufacturing, forging,* and *fabricating* tubing, all in one plant — plus our own steel source as a member of the Copperweld family —speed deliveries, assure highest quality and save you money.

Tubing is our business, not a side line. OSTUCO's unique "Single Source" operation, with unified production control, eliminates shipments from one location to another . . . greatly reduces rejects . . . prevents errors . . . puts an end to buck passing and red tape. You write one order, get one bill, and responsibility is clearly fixed. Write for informative catalog, "Ostuco Tubing."

From Your Blueprint . . . to Your Product
OSTUCO TUBING
Tapering • Swaging • Flanging • Bending
Upsetting • Expanding • Reducing • Beading
End closing • Spinning • Drilling • Slotting
Notching • Flattening • Shaping • Trimming
Threading • Angle Cutting • And Many Others

OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company
Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing
Plant and General Offices: SHELBY, OHIO

OSTUCO SHELBY, OHIO

SALES OFFICES: Birmingham, P. O. Box 2021 • Chicago, Civic Opera Bldg., 20 N. Wacker Dr. Cleveland, 1328 Citizens Bldg. • Dayton, 511 Salem Ave. • Detroit, 520 W. Eight Mile Rd., Ferndale • Houston, 6833 Avenue W, Central Park • Los Angeles, Suite 300-170 So. Beverly Drive, Beverly Hills • Moline, 617 15th St. • New York, 70 East 45th St. • Philadelphia, 2004 Packard Bldg., 15th & Chestnut • Pittsburgh, 1206 Pinewood Drive • St. Louis, 1230 North Main St. • Seattle, 3104 Smith Tower • Syracuse, 2350 Bellevue Ave. • Tulsa, 245 Kennedy Bldg. • Wichita, 622 E. Third St. • *Canadian Representative:* Railway & Power Corp., Ltd.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY, 117 Liberty Street, New York 6, N. Y.

News of the MACHINERY INDUSTRIES

By Thomas Mac New

More Selling Effort Needed to Offset Competition of Foreign Machine Tools. Grinding Problems Discussed at AGMA Meeting.

Sales Stressed At NMTBA Meeting

Major themes dealt with at the 52nd Annual Meeting of the National Machine Tool Builders' Association held in Boca Raton, Fla., last month were foreign and domestic sales and Government machine tool policy. In addition to talks by guest speakers and several reports given by Association officers and committee chairmen, the annual election of officers was held.

Swan E. Bergstrom, 1952-53 President of the Association, and vice president, The Cincinnati Milling Machine Co., started the meeting off by providing some interesting notes in his paper entitled, "Are We Prepared for World Competition?" Citing the foreign machine tool situation, Mr. Bergstrom stated that exports of American machine tools have practically dried up, while the import of foreign tools is continuing at an alarming rate.

He went on to say that our recent emergency has left the door open for foreign machine tool builders to sell their products in this country. "Some of these tools," he remarked, "are inferior to American makes, some are fair; however, there are others that have given a pretty good account of themselves."

Talking about his recent trip to the Brussels show, Mr. Bergstrom stated that there were 3000 machine tools shown with 47 per cent of the exhibitors from West Germany. He claimed that some of the machine tools were new and well-designed and would be competitive in any part of the world. Some of the machine tools he saw in operation in foreign automotive plants were as far advanced from the standpoint of automation as many of the machines existing in American automotive plants.

New officers elected by the NMTBA include: Herbert L. Tigges, executive vice president, Baker Brothers, Inc., 1953-54 President; Milburn A. Hollengreen, president and general manager, Landis Tool Co., 1st Vice-President; Louis Polk, president, Sheffield Corp., 2nd Vice-President and Director; John C. Cotner, president and general manager, Hydraulic Press Mfg. Co., Treasurer.

New directors elected, in addition to Mr. Polk, were: Everett M. Hicks, vice-president and manager, Grinding Machine Div., Norton Co.; and William E. Rutz, executive vice-president and works manager, Giddings & Lewis Machine Tool Co.

Tell Berna was re-appointed General Manager of the Association and Mrs. Frida F. Selbert was re-elected Secretary.

Making Magnets

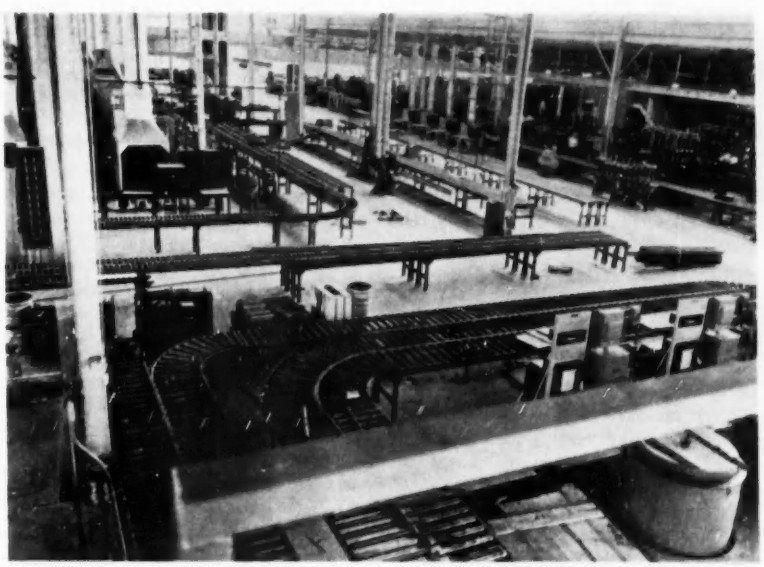
With the addition of the new Edmore, Mich., plant, Carboloy Dept., General Electric Co., has one of the most modern production facilities in the country. Wherever feasible, the utmost in materials handling equipment and automatic production methods have been employed so that more than 2200 different sizes and shapes of Alnico permanent magnets can be made economically in volumes of hundreds of thousands per month.

In addition to automation, the company is utilizing the latest methods of quality control, grinding, sintering, heat treating and metal casting peculiar to magnet production.

In the foundry over 1 million cu ft of air is exhausted every four minutes, and 106,000 cfm is brought in from the outside by fans in addition to that which enters by normal means. Thus, foundry operations are kept as clean as possible to compare with other manufacturing operations.

Sheffield Into Ultrasonic Machining

From the Sheffield Corp., Dayton, Ohio, it is learned that the firm will design, manufacture and market Cavitron ultrasonic machine tools in



This overall view, sans plant personnel, shows the 1½ mile conveyor system used in manufacture of permanent magnets at the new Edmore, Mich., Carboloy plant.

the U. S. and Canada, according to an agreement with Cavitron Corp., Long Island City, N. Y. Both concerns will join in marketing the machines abroad. The agreement provides that the Cavitron Corp. will continue to produce the ultrasonic transducers and generators and will issue licenses for the process through Sheffield.

Gear Semi-Annual

A feature of the American Gear Manufacturers Association Semi-Annual Meeting held recenly in Chicago was a paper on the surface tempering caused by grinding. This was presented by Gordon Murphy, vice president, Foote Bros. Gear and Machine Corp., Chicago, Ill.

Mr. Murphy told the large attendence that heat generated during the grinding operation can reduce the hardness of wearing surfaces and contribute to surface failures. He also described other possible failures in gears due to grinding heat.

In order to solve the problem, the firm checked work subsequent to grinding operations and found many factors which influenced the results from grinding. They were as follows:

1. Type of grinding wheel—grit, size, bond, etc. In general the firm changed to softer, more porous wheels to eliminate surface tempering.
2. Coolant. The company uses both oil and soluble oil coolants and feels that no one coolant serves all purposes. In general, oil is used for tooth grinding operations and soluble oil for external and internal grinding.
3. Wheel speed.
4. Wheel feed.
5. Uniformity of grinding stock. This includes considerations of distortion from heat treating as well as size variations in gear cutting or other machining operations involved.
6. Sealed or decarburized work which would tend to glaze or load the grinding wheel.
7. Human errors.
8. Wheel sharpness. Sharp diamonds and a fairly rapid traverse across the surface of the wheel are necessary to produce best results, according to Mr. Murphy. The amount of stock removed from the wheel is also important. A wheel that is frequently dressed and not abused can be re-dressed by removing 0.002 to 0.003 in.

George H. McBride, Westinghouse Electric Corp., gave some interesting highlights of the 13 week management course given at Harvard University in his paper entitled "A Management Development Program." He stated that the average age of those in attendance was approximately 43 and that businesses of all types and sizes were represented as well as labor unions and foreign firms.

Machine Tools Dip

Latest report from the National Machine Tool Builders Association showed that new orders dropped approximately 24 per cent in September to approximately $64 million. Cancellations also increased sharply, amounting to almost 17 per cent of new orders placed in September, compared with 5.5 per cent in August and a preliminary average of 12.1 per cent for the first nine months of this year. The industry's order backlog also declined to seven months production in Sepember, a small drop from the 7.3 figure in August.

NMTBA also predicts that despite the fact that deliveries during the first nine months of this year were running 11 per cent ahead of the same period of last year, total shipments for 1953 will only slightly exceed the 1952 level. The Association expects production this year to be about the same as last year's. Shipments by the industry in 1952 amounted to $1,125,900,000.

On the optimistic side, the builders said that the drop in defense orders has been offset somewhat by increased orders for machine tools for civilian purposes. It was added that this indicates a growing recognition of the need for modern equipment to reduce costs in the highly competitive situation which has developed following the end of the Korean war.

New Tools Needed

The latest survey by the American Society of Tool Engineers turns up some promising news for suppliers of production and plant equipment. The report shows that by its own estimate American industry finds 28 per cent of its current equipment and processes obsolete and inadequate.

Additional findings are that, of the machining equipment now being used, 30 per cent is considered obsolete and 34 per cent of present inspection methods are obsolete.

In the materials handling equipment field 28 per cent is either inadequate or completely obsolete.

The industry estimates that 28 per cent of its metal forming processes are out of date and require modernization or replacement; one-quarter of the production welding equipment is obsolete; and 23 per cent of grinding and finishing equipment is outdated or worn out.

Figures given represent an evaluation by top industrial executives and engineers of their own equipment and processes. Tabulations are broken down into four categories; small plants with fewer than 250 employes; intermediate plants with 250 to 999 workers; large plants with 1000 to 4999 employes; and very large firms with over 5000 workers.

At the recent ASTE business meeting, the research project committee was brought up to its proper strength of eight men. These men are all specialist in their respective fields and are not necessarily members of the ASTE. Major function of the committee is to authorize and supervise the expenditure of $75,000 for research. All members of the committee were elected for an indefinite term.

3D Chip Flow

Several machine tool companies, under the auspices of the NMTBA, have recently sponsored a research program at Cornell University dealing with a study of three-dimensional chip flow. This research project was the first attempt to determine, for cuts in various grades of steel, what dimensions control the form of the chip, to suggest the best angles of rake and clearance, and to give the tool room a simple rule which will ensure optimum results both as to chip and tool life.

During the past month, a report of the research project conducted during the past two years has been published by the sponsors. It deals primarily with turning operations, applying equally well to engine lathes, automatic lathes, turret lathes, boring mills, and automatic bar machines, and will be helpful on other cutting operations.

CEMA Elects New Officers

With 85 per cent of the member companies represented for a record attendance, the 20th Annual Meeting, held recently in White Sulphur Springs, W. Va., of the Conveyor Equipment Manufacturers Association dealt with sales promotion.

New officers elected at the meeting were: R. F. Tomlinson, manager, Oliver Corp., A. B. Farquhar Div., York, Pa., was elected President of the organization. The Vice-Presidency went to Jervis C. Webb, president, Jervis B. Webb Co., Detroit; E. E. Boberg, sales manager, Standard Conveyor Co., North St. Paul, Minn., Treasurer; and Russell B. Maas, president, Screw Conveyor Corp., Hammond, Ind., Secretary.

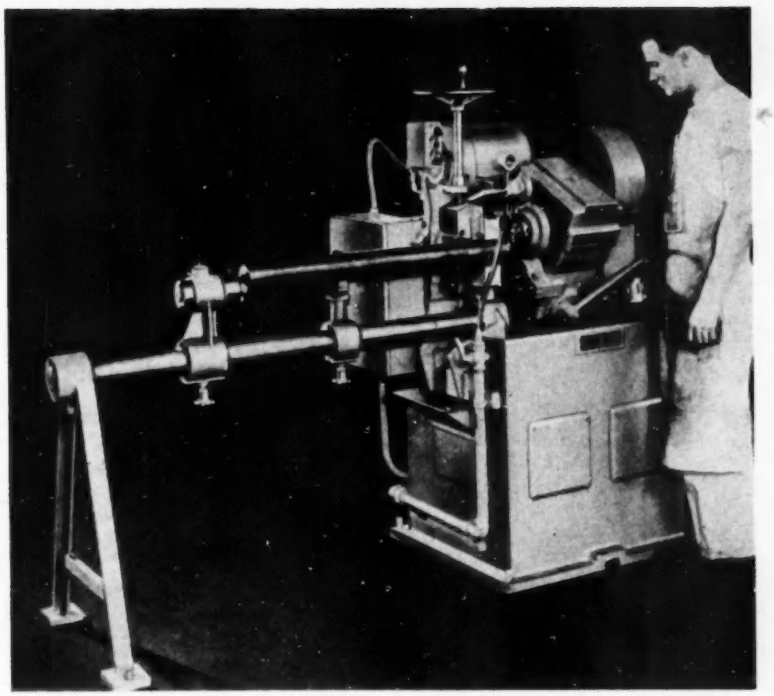
(*Turn to page* 110, *please*)

NEW EQUIPMENT PLANT • PRODUCTION

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 89

Milling and Centering Machine

This No. 0 Centrmil milling and centering machine handles work from ¾ in. to 3½ in. dia., from five in. to 48 in. long. Simplicity and speed of adjustment are said to make it ideal for the steel room or lathe department for miscellaneous shaft work.



After shaft has been located and clamped, the rocker-type milling head mills one end. The milled end is then manually centered with a ¾ in. (max.) center drill. Part is reversed and located from center or end previously machined for milling and centering opposite end. Power feed to the center drill and power clamping can be provided if desired. (Sundstrand Machine Tool Co.)

Circle 66 on page 89 for more data

Vapor Degreaser

Features of an improved design vapor degreaser include: obstruction free tank walls, recessed condensing coils, removable pump chamber and water separator manufactured of solid stainless steel, one end maintenance, and demand type control of water into the water condensing system.

The condensing coil commonly located around the interior walls of a vapor degreaser has now been recessed into a back compartment. This recessed multi-tiered condensing coil extends for the full length of the degreaser. The coil also has the advantage of being easily replaced.

The over-size water separator and pump compartment have been fabricated of solid stainless steel and welded to a flanged plate to permit removal of the complete unit to permit periodic inspection of the storage tank interior. This design permits the conversion of a straight vapor degreaser to a vapor spray degreaser by the customer.

All service connections and cleanout openings are located at one end of the tank, making a neater installation and simpler maintenance.

The automatic water temperature regulator is so installed that maximum water is required only at times of maximum heat input, when no work is being cleaned. *Metalwash Machinery Corp.*

Circle 67 on page 89 for more data

Fluxes for Automatic Hardsurfacing

A technique for automatic hardsurfacing has been developed in which the alloy content of the deposited metal is supplied by an agglomerated granular flux rather than by the electrode. It is possible to apply automatic hardsurfacing with conventional mild steel electrode simply by substituting for the mild steel flux, normally used, the new hardsurfacing flux. Any standard automatic welding head or Manual Lincolnweld equipment may be used without any changes; all the proven advantages of hidden arc welding such as uniform feeding and exact arc control are retained.

Flux H-545 is to be used whenever a smooth layer of good abrasion resistance and high impact strength is required. The H-545 weld metal is an alloy of carbon, manganese, silicon, chromium, molybdenum and vanadium. The deposit is magnetic at room temperature and with recommended procedures has a consistent hardness at 53-57 Rockwell C range.

Flux H-550 is used for extremely abrasion resistant deposits with good impact strength. The H-550 weld metal is an alloy of carbon, manganese, silicon, chromium and molybdenum. The deposit is magnetic, semi-austenitic at room temperatures and with recommended procedures has a consistent hardness. A broad range of 36-62 Rockwell C hardness can be developed. Deposit is nonmachinable. *Lincoln Electric Co.*

Circle 68 on page 89 for more data

NEW EQUIPMENT PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 89

L. A. Line of Electric Motors Is Announced

The L.A. line of electric motors is now available in the new NEMA frame sizes. The motors are offered in open drip-proof, totally-enclosed fan-cooled and explosion-proof enclosures in ratings up to 40 hp at 3600 rpm.

The L.A. line features modern styling, improved ventilation, greater protection, a new conduit box arrangement, new bearing construction, and more versatile mounting.

Utilizing more power in a smaller unit has been accomplished by the use of larger lamination diameters, and longer stacking with shorter coil ends. Ventilation is more efficient and effective due to better utilization of aerodynamic principles.

The L.A. line is also lighter and more compact for each horsepower and speed. Size and bulk of the cast iron housing and motor bearing brackets have been reduced without sacrificing mechanical strength. As a result of the redesign, the new motor line delivers the same performance as older units, with comparable starting and breakdown torque, efficiency, power factor, temperature rise, and service factors.

Bearings and shafts have been selected for long life and better overload capacities for V-belt drives. In motors of all sizes, special effort has been made to use bearings that are easily obtainable from local stocks.

Bearings are factory lubricated with an ample grease storage reservoir. In addition, grease fitting can be supplied as an optional feature. Effectiveness of grease seals has been improved. Back-end bearings are locked in place by a bearing cap, and locknuts on the motor shafts minimize end-play. Bearing brackets also have cast-in slots to allow easy removal of bearing brackets for inspection or maintenance.

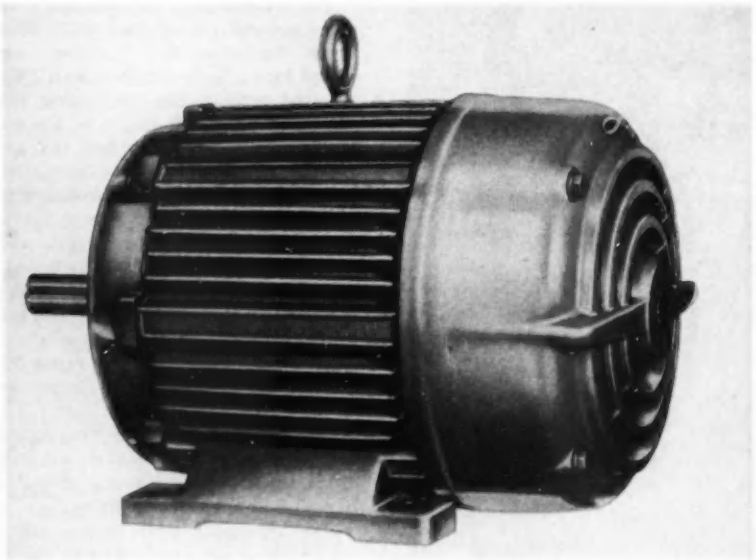
New motors in the open, drip-proof construction now have single end ventilation—cooling air enters at one end, passes entirely through the motor, and exhausts at the other end. This eliminates ventilation openings in the housing and provides a well-enclosed motor suitable for any mounting position.

The conduit box on both open and enclosed motors is split-type that separates into halves for easy electrical connection. A lead identification spacer inside the box provides permanent and positive identification of the various leads—even if the lead tags should become lost. A new, alternate conduit arrangement for the open, drip-proof motor permits omission of the conduit box entirely in crowded quarters.

Open L. A. motors are considerably more drip-proof than previous units and are also much better protected. Stator housings in both enclosures are long enough to protect the coil ends from damage during manufacture and when disassembled.

Other features and advantages of the new line are a new nameplate with more complete information, including bearing sizes, service factor, and NEMA design type, in addition to the data carried on former nameplates. The new motors also have a removable plug in the front-end bearing to permit speed checking. *Louis Allis Co.*

Circle 69 on page 89 for more data



The L.A. totally enclosed, fan cooled and explosion proof motor.

Cut-Off Wheel

An improved reinforced, resinoid, hub-type cut-off wheel, known as the BFR wheel, replaces one with the same designation which has been on the market.

Longer life is the main feature of the improved wheel. Tests show that increased life of up to a third more than the former wheel can be expected with the same quality of cut. These more durable wheels also tend toward a better uniformity in grinding action wheel to wheel and lot to lot. *Norton Co.*

Circle 70 on page 89 for more data

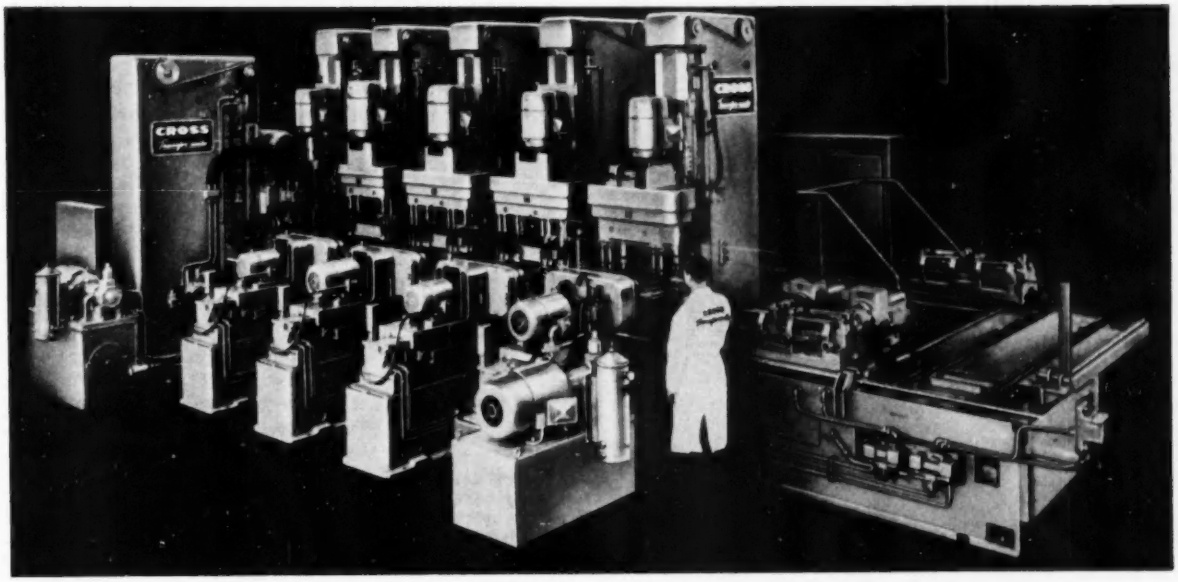
Small Light Source

A featherweight two inch monochromatic light generator for inspection of flatness, finish and size with optical flats is now available.

Because of its size (base is seven in. long by 3½ in. wide), the Monolight permits on-the-job checks, for example, on the chuck of a surface grinder or on the surface of laps. Adequate magnetic shielding of lightweight aluminum permits inspection to be made on magnetic chucks when chuck power is on. It is not equipped with a stage. *The DoALL Co.*

Circle 71 on page 89 for more data

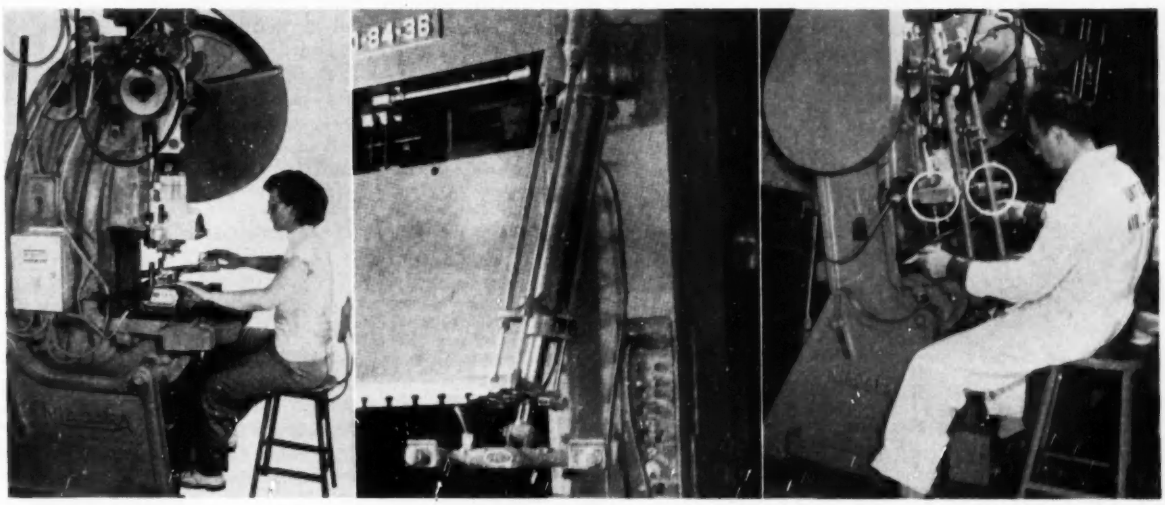
Transfer-matic Drills, Bores, and Mills Intake Manifolds



Transfer-matic type for drilling, boring and milling intake manifolds has been announced. Manifolds are processed at the rate of 218 per hour at 100 per cent efficiency. The machine, which has seven stations including loading and unloading, performs 54 operations—22 drilling, eight chamfering, two reaming, 12 tapping, eight boring, and two milling. Two parts are machined at one time at each station. Palletized work holding fixtures are used to carry the irregular shaped manifolds automatically from station to station. Power wrenches are used for operating the work holding fixtures automatically. Other features include pre-set tools, built-in chip conveyor and automatic cleaning unit for removing chips from fixtures. Electrical and hydraulic construction is to Joint Industry Conference standards. (Cross Co.)

Circle 72 on page 89 for more data

Three Machine Controls Feature Safety and Production Gains



Clutch Control

A one or two hand clutch control has a light touch and instantaneous electrical response for greater production. The two hand model prevents tying down. Electrical systems can be tied in. (Micro Div., Minneapolis-Honeywell Regulator Co.)

Circle 73 on page 89 for more data

Flexible Arm

For positioning the run and stop button of any press, this telescoping arm is available. It can be relocated with hand wheels, and does not block aisle space. Finger grips allow the operator to relax his arms. (Danly Machine Specialties.)

Circle 74 on page 89 for more data

Atomic Safeguard

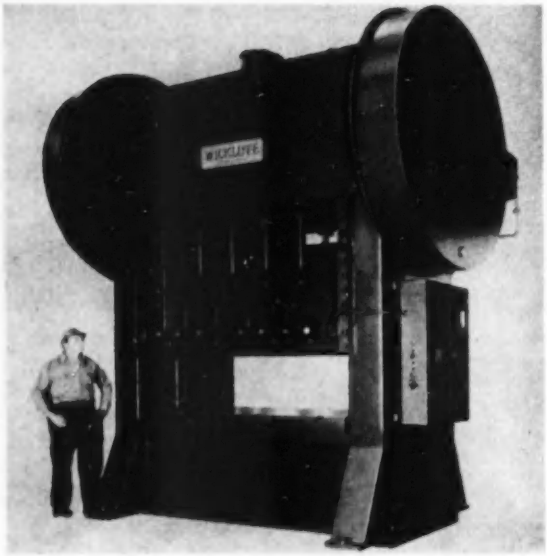
Operators of this punch press must wear wristbands of radio-active crystals to operate it. Three Geiger tubes enclose the punching area, stopping the press if hands enter the danger area. The bands are harmless. (Hazatrol, Inc.)

Circle 75 on page 89 for more data

NEW EQUIPMENT PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 89

Wickliffe Presses Are Introduced



A Wickliffe single-action, straight side, double-crank mechanical press rated at 225 tons.

A line of machines to be known as Wickliffe presses, will supplement the Steelweld bending press and shear lines. They are intended for uses such as forming, blanking, piercing, trimming, light embossing and drawing, in a range of 160 tons capacity and up.

Frames are straight-sided and consist of four members—crown, two side housings and bed—held solidly together by tie rods shrunk in place. All members are "box-type" and of heavy all-welded steel construction.

Slide adjustment is of the barrel-type.

Operated by air, the clutch and brake are designed with low-inertia principle. Cool operation is assured, even after long periods of continuous production runs because of four contributing factors: Low unit working pressure on clutch and brake facings, low inertia of clutch and brake discs which minimize energy to be absorbed, hollow center ventilating discs which have large cooling passages, and overall design for fast heat dissipation.

Worn linings are replaced without removing clutch or brake from the machine. They are of the rivetless type.

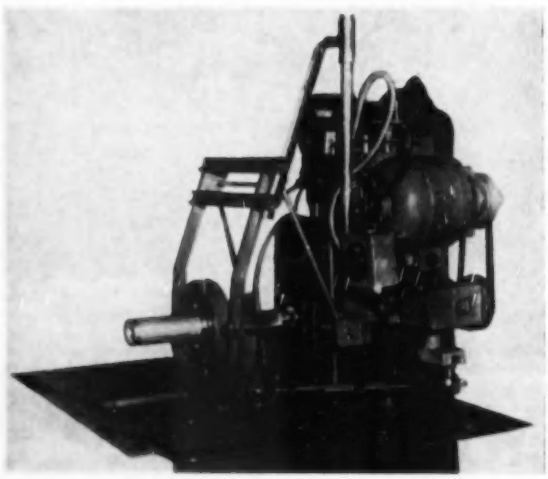
Particular attention has been given to ease of operation and safety. By means of push buttons, the operator has full control of the press during any part of the stroke. Adjustment of the slide is also push-button controlled. All rotating parts are well removed from the operator's normal reach and all gearing is fully enclosed.

Complete lines of single, two and four point, single-action presses have been developed. *Cleveland Crane Co.*

Circle 76 on page 89 for more data

Honing Machine Attachment

A low priced automatic stroking and timing attachment for converting manually operated honing machines into completely automatic units has been developed. The manufacturer claims that with this attachment an operator can add one third to his manual production on a single machine or he can run several machines at the same time, depending on the work cycle. Spherical honing is said to be economical by means of a special automatic stroking attachment. Standard attachments are available for practically all horizontal honing machines, including Sunnen, Ammco and Superior. Special attachments can be supplied to order. (National Pioneer Co.)



Circle 77 on page 89 for more data

Hydraulic Line

A complete line of hydraulic cylinders, valves, pumps, motors, power units and accessories is now available from one source. The line has been divided into nine individually bound catalogs: No. 601—Pumps, Motors, Power Units and Accessories; No. 701—150 PSI Air or 3000 PSI Oil Hydraulic Cylinders; No. 721—2000 PSI Cylinders; No. 741—3000 PSI Cylinders; No. 801—2000 PSI Valves—Threaded Connections; No. 821—3000 PSI Valves—Flange Connections; No. 841—3000 PSI—Sub-Plate Connection; No. 901—Accessories, and No. 1001—H-P-M's Engineering Manual. *Hydraulic Press Mfg. Co.*

Circle 78 on page 89 for more data

Fast Feed Profile Milling Machine for Nonferrous Metalworking

The A-42 profile milling machine is now being introduced to the metalworking industry, for production parts of aluminum and similar metals. Design feature is the coordinated tridirectional feed system, that makes possible the milling to any profile or contour line without slow-up of feed at any point.

In this system, rotary InvOmil power feed of the cutter head is automatically combined with transverse and longitudinal power table feed for milling along any desired profile line. Coordination of feed movements is electronically maintained. The machine operator directs feed travel by means of two simple hand controls.

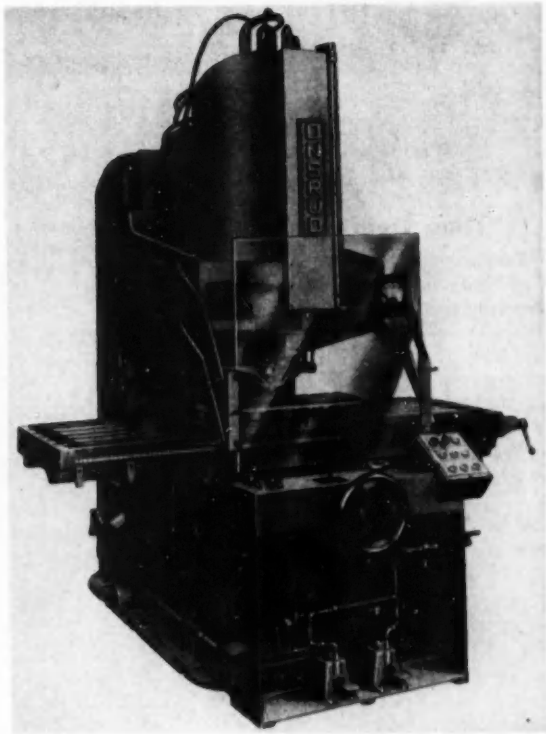
Operation of the machine makes use of a template positioned in set-up above the work piece. The cutter head assembly includes a follower. The operator by means of the hand controls maintains contact between follower and template, and feeds the cutter through the milling cut. Follower and cutter are held in proper position by a pneumatic pressure device known as the Pneumatic compensator.

Stroke of the pneumatic cylinder is four in. In effect the operator has a positioning range of four in. along any point of which the follower and cutter will be accurately in position in relation to the template. As a result, control accuracy is not required by the operator, and the operator may carry out an operation at top milling speed.

The vertical direct drive cutter motor is rated at 15/30 hp at 7,200/14,000 rpm.

Table size is 27 in. wide and 80 in. or 98 in. long as specified. Distance from base of chuck to table surface is 0.50 in. minimum to 18.00 in. maximum. Maximum travel of table in feeds is 12 in. for transverse power feed, and 42 in. for longitudinal power feed with the 80 in. table and 60 in. for longitudinal power feed of the 98 in. table.

While designed for profile milling, the A-42 offers equally high production in straight line milling. For this type of milling, table dogs may be set to control length of table travel in either longitudinal or transverse feed. Milling cuts in profile or straight line milling are made with precision. The machine is ruggedly built with full table support. In profile milling, accuracy will be equal to that of the template. In straight line milling, accuracy is assured by the overall rigidity of the machine construction.



The Onsrud profile milling machine for nonferrous work.

Because of constant feed rate in profile milling, cutter and work are protected during the milling operation. At high cutter speeds, if feed is stopped or materially slowed down such as in milling a 90 deg corner, it has been found that sufficient heat is generated to cause oxidation of the aluminum surface, instantly dulling the cutter's edge. In standard type machines this slow-down or stopping of feed cannot be avoided. With the A-42, feed can be held constant in any type of corner or profile line cut. *Onsrud Machine Works, Inc.*

Circle 79 on page 89 for more data

Arnoldair Attachment

Combining the Dimensionair with the Arnold grinding gage, the Arnoldair (model A-77) high-magnification air attachment provides for the production of cylindrically ground work to a remarkably consistent close tolerance. Roughness of the part usually causes a corresponding flicker of the hand on the dial indicator, but this flicker is eliminated by cushioning the effect of the minute roughness of the work surface. *Federal Products Corp.*

Circle 80 on page 89 for more data

Automatic Filter

An industrial filter now on the market automatically rotates fresh filtering area into position wnile simultaneously ejecting contaminant cake. Filtering screen material and size of screen opening can be supplied in monel, stainless steel, brass or bronze to fit requirements.

The new filter eliminates consumption of throw-away filtering media since the wire filtering screen has many times the life of the finest cloth filtering webs. The filter may be used on an individual machine unit, or as a central filter for many units. The gallon capacity of filtration may be easily increased by adding filter drums in tandem—separately, or in the same tank to meet requirements. *Murray-Way Corp.*

Circle 81 on page 89 for more data

NEW EQUIPMENT PLANT • PRODUCTION

For additional information, please use postage-free reply card on page 89

Time Delay Relay

For control circuits requiring a time delay initiated by a momentary impulse, such as from a pushbutton or microswitch, an Agastat time delay relay has been developed. The pneumatically-controlled time delay is adjustable over a range from 0.1 sec to 10 min or more.

Time delay is controlled by the flow of air through an orifice. Air used for timing is recirculated within the timing chamber, keeping it free of dust and other foreign material. Size of the orifice, which determines the length of time delay, is determined by a needle valve readily adjusted by a screw on top of the timing chamber.

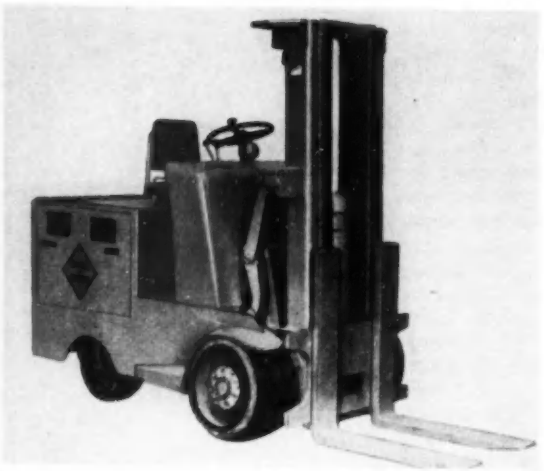
The NEH Agastat has a normally-closed auxiliary hold-in switch. In the deenergized state, the auxiliary switch contacts are held open by the operating spindle, which is an extension of the solenoid core. On energization of the Agastat coil, these contacts close immediately to keep the coil energized. The Agastat switch operates at the end of the time delay.

Including the auxiliary switch, the largest NEH Agastat is only 5⅞ in. high and 2⅛ in. square. It is available for all standard ac and dc voltages, in single-pole, double-throw, or double-pole, double-throw models. The Agastat switch is rated 15 amp at 115 volts, 60-cycle ac. *A'G'A Div., Elastic Stop Nut Corp.*

Circle 82 on page 89 for more data

Electric Truck

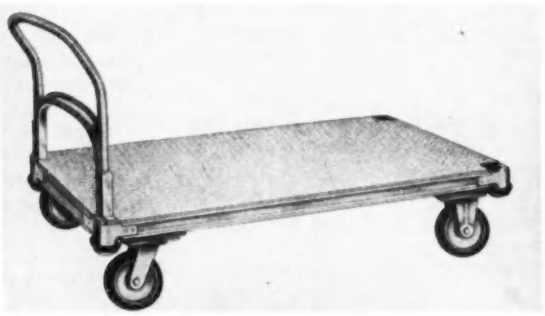
A 10,000 lb capacity, electric-powered, hydraulically - operated fork truck has just been introduced. The new model has front wheel drive, rear wheel steer, is designed for tiering with telescoping lift, and tilting. Specifications: Length, overall, less forks—97 in.; height, uprights telescoped — 83 in.; height, uprights extended (36 in. vertical fork leg)—146 in.; maximum lift — 110 in. The truck has a 61 in. wheelbase and, equipped with 42 in. forks, turns in intersecting aisles of 83 in. The hoist unit consists of a single low-pressure simplex hydraulic cylinder. Combination worm and spur gear drive is employed with a fully articulating caster type trailing axle. (Elwell-Parker Electric Co.)



Circle 83 on page 89 for more data

Light Truck

An all-magnesium four-wheel platform truck for general materials handling use is believed to be the first unit of its kind to be mass-produced. It is offered in ten models, weighing only 1/4 to 1/3 as much as comparable equipment of similar size. All trucks in the series are rated to handle loads up to 1000 lb. (Magline, Inc.)



Circle 84 on page 89 for more data

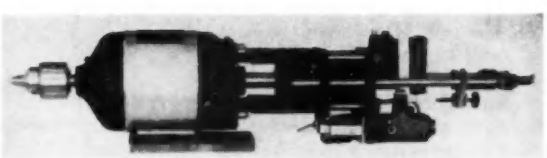
Self-Contained Drill

A self-contained drilling unit using a traversing motor shaft for work spindle is now available. It is said to apply even torque with practically no end play.

Drill has an air feed for rapid advance to work and hydraulic control to completion of work cycle with uniform feed. Depth accuracy is within .001 in.

The drill can be equipped with tapping unit controlled so tap follows its own lead without chamfering first thread or stripping threads on return stroke. *Black Drill Co., Inc.*

Circle 85 on page 89 for more data

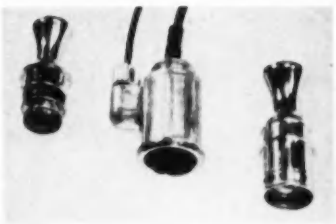


Black drill.

NEW PRODUCTS

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 89

Lighter Guard Protects Fingers from Hot Metal



The Safety-Guard cigarette lighter is equipped with a protective "sleeve" that trips out and forms a wall around the red-hot filament. This simple device prevents fingers from brushing hot metal. The sleeve also acts as a wind-guard that keeps the filament from cooling off, giving a longer light. Finally, it serves as a repository for ashes and flying sparks.

The new lighter is surrounded by a ring of amber light that glows continually, and has an illuminated well to guide the smoker's hand. *Casco Products Corp.*

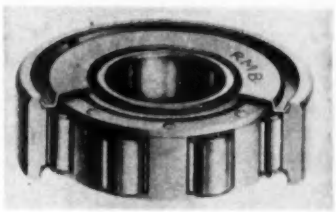
Circle 26 on page 89 for more data

Pop-Out Card Warns Driver of Service Needs

The Servicator reminds the driver when to get the oil changed, when to lubricate the chassis, switch tires and so forth. Mounted in the rear view mirror, it is hooked up electrically with the engine to record the number of running hours. After a predetermined number of hours, the Servicator will thrust out one of 50 cards, telling what services to have performed. *Carter & Galantin.*

Circle 27 on page 89 for more data

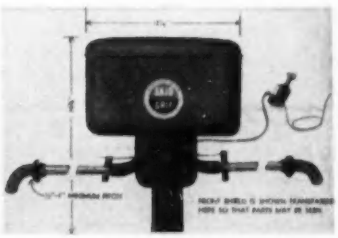
Small Roller Bearings for Radial Loads



Miniature roller bearings are now available in three types and seven sizes from 0.4724 in. to 1.0236 in. OD., identified as RMB types N, NU and NP. All three types permit some axial displacement of the shaft. The roller assembly is retained by a snap-ring on the inner race and a section of the shield at the outer race. In type NP (illustrated) the outer and inner races are permanently assembled, and the bearing has a removable dust shield. *Landis & Gyr, Inc.*

Circle 28 on page 89 for more data

Motorized Road Sander for Six or 12 Volts



Skid Grip automatic road sander is now in full production with distribution in the entire northern half of the country and in Canada. A six-quart steel tank is mounted in the rear of the trunk compartment. Two aluminum tubes with rubber spouts lead to position above tires. At a touch of the dashboard switch, the six or 12 volt two-speed motor vibrates the tank and tubes and forces grit flow to both tires simultaneously. *Hecker Products Corp.*

Circle 29 on page 89 for more data

Brake Lining Features Rapid Installation

Recently announced is the Lock-On brake lining which reportedly can be installed in the same time that it takes to change a tire. The patented device is a metal strip to which the lining is bonded at the factory. It is installed by means of metal tabs directly to the old brake shoe. Bonded lining can reportedly be quickly removed by using city or bottled gas. *The Russell Manufacturing Co.*

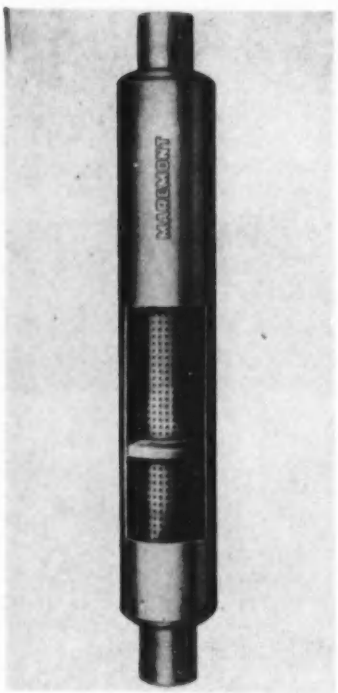
Circle 30 on page 89 for more data

NEW PRODUCTS

For additional information, please use postage-free reply card on page 89

T-D Muffler

A line of tough duty mufflers, designed especially for gas and Diesel trucks, are now ready for distribution. The TD line of mufflers consists of heavy duty mufflers adaptable to over 25 makes of trucks. A wider



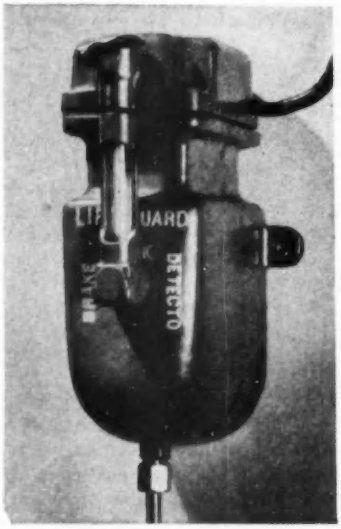
range of application for the line is achieved through the use of bushing kits.

The body, tube and internal supports are of 16-gage steel while the end caps are of 12 gage, boilerhead shaped, steel. Longer life is claimed through the use of arc welding on the domed end caps and double seam welding on the body. The muffler also features a straight-thru one-piece perforated tube which serves as inlet and outlet.

The muffler is designed for either vertical or horizotal mounting. For vertical mountings a protective shroud and a flexible exhaust coupling are available. *Maremont Automotive Products, Inc.*

Circle 31 on page 89 for more data

Brake Fluid Gage



To prevent accidents caused by loss of brake fluid, a safety device known as Lifeguard employs a calibrated electronic float assembly which is sealed to make it dust and tamper proof. Fitted with a built-in alarm which is attached by wire to the ignition switch, the device gives an audible signal should the brake fluid fall below a safe level.

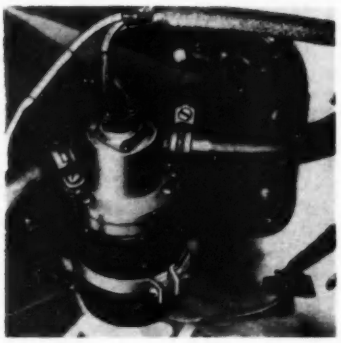
In cases of serious rupture in the brake fluid system, brakes are said to function normally, allowing a safe stop because the unit continues to feed from its safety reservoir which contains almost four times as much brake fluid as the average master cylinder holds. Mounted on the firewall or engine, Lifeguard is connected to the top of the master cylinder by a short length of tubing. A sight gage is provided on the front of the unit. *Arlington Industries, Inc.*

Circle 32 on page 89 for more data

Heat Circulator

Now on the market is a device, known as Carheet, which is said to pump stored-up engine heat through the car heater after the engine is shut off. Cars and trucks are reportedly kept warm for 30 minutes or more before engine heat is gone.

Engine warmth continues to flow to the heater and shuts off automatically through a safety switch when the water temperature drops to 85 F. It is claimed that installation is simple

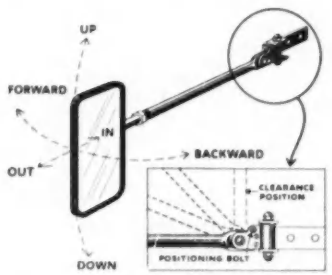


by cutting the present heater hose and slipping it over pump intake and outlet of the circulator (usually mounted on the inside of the fender well). *Heat Circulator Co.*

Circle 33 on page 89 for more data

Mirror Arm

The No. 406 re-positioning mirror arm—designed to fit the cab of any 1953 Ford truck—features "Delbow" joint which permits the mirror arm to be swung up vertically for clearance, yet automatically stops the arm at original driving position when it is lowered again. A positioning bolt bears against the butt end of the mirror shaft when in driving position.



The arm can also be adjusted to any desired position in the forward/backward arc. The mirror arm itself is of the tubular telescoping type.

The arm is available in standard, short or extra-long models. Construction is heavy-gage steel throughout, with black, baked-enamel finish (there is also a deluxe model in chrome-plated brass). All nut and bolt assemblies are zinc-plated steel (irridited finish) and include heavy-duty lock washers. The arm will take any standard make mirror head. *Delbar Products, Inc.*

Circle 34 on page 89 for more data

Free INFORMATION SERVICE

Postage-Free Postcards Are Provided Here for Your Convenience to Obtain FREE LITERATURE and Additional Information on NEW PRODUCTION AND PLANT EQUIPMENT, AND NEW PRODUCTS Described in This Issue of AUTOMOTIVE INDUSTRIES. Please Circle Code Numbers of Items in Which You Are Interested, Print Name, etc., and Mail Promptly for Quicker Service.

USE THIS POSTCARD

FREE LITERATURE

Modernizing Presses

Bulletin No. 45 shows modernization and conversion assemblies that can bring single crank presses up to date. *E. W. Bliss Co.*

Circle 1 on postcard for free copy

Lathes and Shapers

A catalog, just off the press, describes the newest features of a line of nine in., 10 in., 11 in., and 12 in. lathes, lathe accessories, and eight in. shaper and accessories. Address a request on company letterhead to *Logan Engineering Co., Lathe Div., Lawrence and Lamon Ave., Chicago 30, Ill.*

Lubricating Conveyors

How to automatically lubricate entire conveyor lines—trolley wheels, chains, drives, carriages and rollers—without stopping the line is illustrated in a new catalog sheet, 22-225. *Alemite Div., Stewart-Warner Corp.*

Circle 2 on postcard for free copy

Fastener Problems

A collection of problems and solutions to fastening problems of the industry, which first appeared as advertisements, are offered in a new booklet. *Elastic Stop Nut Corp. of America.*

Circle 3 on postcard for free copy

Company Story

"A Picture Story of The R. C. Mahon Company" a 46-page, two-color, profusely illustrated book designed to portray the company's extensive metal fabricating and production facilities, its products and services, and its capacity to serve industry, is available. *The R. C. Mahon Co.*

Circle 4 on postcard for free copy

Cut-Off Wheels

A complete revision of its 36-page booklet on cut-off wheels contains much information which is completely new and up to date. *Norton Co.*

Circle 5 on postcard for free copy

Blast Cleaning

"Blast Cleaning," a 32-page booklet, aims at explaining abrasive cleaning in a new way. Its purpose is to supply non-technical information to anyone who would like to know more about the possibilities of blast cleaning in his field. *Pangborn Corp.*

Circle 6 on postcard for free copy

Spintesting

Vacuum testing of rotating parts in three sizes of spin pit is described in a new folder. *Warren Brothers Manufacturing Div.*

Circle 7 on postcard for free copy

(Please turn page)

THIS POSTCARD VOID AFTER FEB. 1, 1954

Circle code numbers below for Free Literature, New Equipment or New Product Information.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96

Fill in below for more information on other products, featured in Advertisements of this issue.

12/1/53

PAGE ..... PRODUCTS .....

....

....

....

NAME ..... TITLE .....
(Please Print)

COMPANY OR BUSINESS .....

ADDRESS ..... (No. & STREET) ..... (CITY) ..... (ZONE) ..... (STATE)

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

POSTAGE WILL BE PAID BY

AUTOMOTIVE INDUSTRIES
P. O. Box 66,
Village Station,
New York 14, N. Y.

Readers Service Dept.

Heating Controls

Complete information on electronic controls for heating, ventilating, and air-conditioning is now available in a new catalog F 6166. The catalog also contains a description of the various elements required for system application and illustrates their usage. *Barber-Colman Co.*

Circle 8 on postcard for free copy

One-Ton Fork Truck

A brochure detailing its newly developed 2000-lb capacity electric fork truck, has just been released. It is a compact vehicle with short wheelbase and 360 deg steering. *Elwell-Parker Electric Co.*

Circle 9 on postcard for free copy

Lathe Wall Chart

A lithographed wall chart entitled "Nomenclature Of a Saddle Type Turret Lathe" is on 120-lb paper, 24 x 36 in. Sixty-three machine features are indicated by numbers and arrows, with numerical listing at the right of the machine view. A decimal equivalent list is shown at the left. A single copy will be mailed out at no charge to those persons writing on their business letterhead directly to *Gisholt Machine Co., Madison 10, Wisc.*

Pressure Cells

Utilization and specifications of new SR-4 high frequency pressure cells (Type "HF") in the measurement of rapidly changing pressures up to 20,000 psi are presented in illustrated bulletin No. 4107. *Baldwin-Lima-Hamilton Corp.*

Circle 10 on postcard for free copy

USE THIS POSTCARD

Atmospheric Corrosion

Bulletin A-149, 22 pages well documented with charts and tables, reports the effects of nine years atmospheric exposure on low alloy steels. Includes data on weight losses, pit depths, thickness measurements, calculated pitting factors, and the weight of rust on specimens. *International Nickel Co.*

Circle 11 on postcard for free copy

Aircraft Components

A 20-page booklet showing many of the company's 1953-54 line of aircraft components has been announced by the Apparatus Sales Div. Designated GEA-5972, the two-color booklet describes products ranging from subminiature metal-clad capacitors for use in aircraft electronic equipment to air turbine drives, used in the operation of generators, hydraulic pumps and fuel pumps. *General Electric Co.*

Circle 12 on postcard for free copy

Pressure Plugs

Heat-treated precision pressure plugs, which seal tight without sealing compound by crushing crests and roots in softer threads of mating tapped parts, are discussed in a new bulletin, 883. *Standard Pressed Steel Co.*

Circle 13 on postcard for free copy

S-S Automatics

Just off the press is a bulletin describing the 4¼-in. and 5¾-in. AB and 4¼-in. AW single spindle automatics. *Cleveland Automatic Machine Co.*

Circle 14 on postcard for free copy

Steel Treating Plant

Facilities available for flame hardening and other processes are outlined in a booklet just published. *The Lakeside Steel Improvement Co.*

Circle 15 on postcard for free copy

Shielded Welding

Two new bulletins, GEA-6028 and GEC-989, on the Fillerarc consumable-electrode gas-shielded welding process are available. *General Electric Co.*

Circle 16 on postcard for free copy

Silicone Rubber

Two new silicone rubber stocks, known as Silastic 50 and Silastic 80, have high tensile, elongation and compression set characteristics according to data sheet 9-208. They cure to Shore A hardnesses of 50 and 80, respectively. Semi-translucent, they both can be colored to any shade with heat-stable pigments. *Dow Corning Corp.*

Circle 17 on postcard for free copy

(*See preceding page*)

BUSINESS REPLY CARD

No Postage Stamp Necessary If Mailed in the United States

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
New York, N. Y.

POSTAGE WILL BE PAID BY

AUTOMOTIVE INDUSTRIES
P. O. Box 66,
Village Station,
New York 14, N. Y.

Readers Service Dept.

THIS POSTCARD VOID AFTER FEB. 1, 1954

Circle code numbers below for Free Literature. New Equipment or New Product information.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90	91	92	93	94	95	96

Fill in below for more information on other products, featured in Advertisements of this issue.

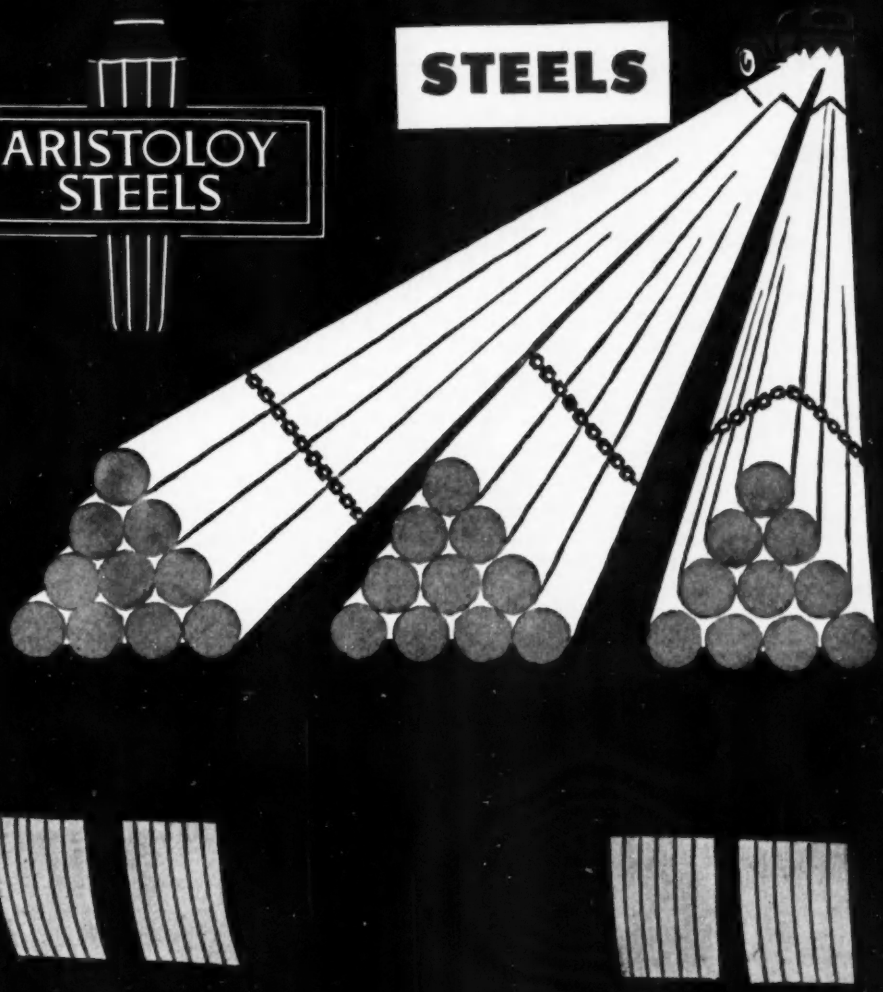
12/1/53

PAGE PRODUCTS

NAME ..... TITLE .....
(Please Print)
COMPANY OR BUSINESS .....
ADDRESS ..... (No. & STREET) (CITY) (ZONE) (STATE)

ELECTRIC FURNACE STEELS

ARISTOLOY STEELS



STANDARD STRUCTURAL ALLOY • BEARING QUALITY
ALLOY TOOL • SPECIALTY • NITRALLOY • CARBON TOOL
AIRCRAFT QUALITY

Hot Rolled • Forged • Annealed • Heat Treated • Normalized
Straightened • Cold Drawn • Machine Turned • Centerless Ground

COPPERWELD STEEL COMPANY • WARREN, OHIO

117 Liberty Street
New York, New York

325 W. 17th Street
Los Angeles 15, Calif.

176 W. Adams Street
Chicago, Illinois

711 Prudential Building
Houston 25, Texas

P. O. Box 1633
Tulsa, Oklahoma

3104 Smith Tower
Seattle, Washington

1578 Union Commerce Bldg.
Cleveland, Ohio

Monadnock Building
San Francisco 5, Calif.

7251 General Motors Bldg.
Detroit, Michigan

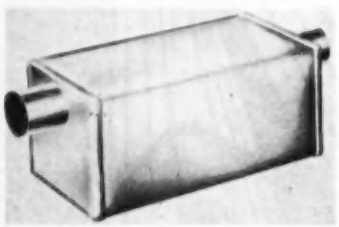
803 Loew Building
Syracuse, New York

NEW AIRCRAFT PRODUCTS

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 89

Cockpit Muffler

A midget, lightweight muffler has been developed to whip the whine of jet cockpit air conditioning systems.



It is said to fit easily into any existing aircraft air conditioning system.

The high velocity air line muffler is five in. square by 10 in. long and weighs 3½ lb. Constructed of steel-lined aluminum, it combines effective noise reduction with minimum pressure drop and will operate at temperatures of 500F and above.

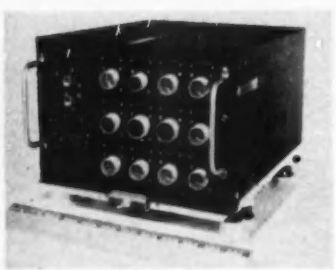
The muffler provides a 50 decibel high band attentuation and an overall noise reduction up to 23 decibles. *Industrial Sound Control.*

Circle 46 on page 89 for more data

Computer

An electromechanical flight data computer has just gone into production. To be known as the C-2 true airspeed computer, the unit will act as a central data source on high performance aircraft, furnishing multiple outputs of atmospheric pressure, Mach number, and true airspeed.

The computer combines a differential pressure pickup and a static pressure pickup with an electromechanical computer mechanism which is hermetically sealed into a cylindrical container. The computer mechanism includes three servos operating from individually sealed subminiaturized amplifiers. A flush resistance-type temperature bulb measures air temperature.

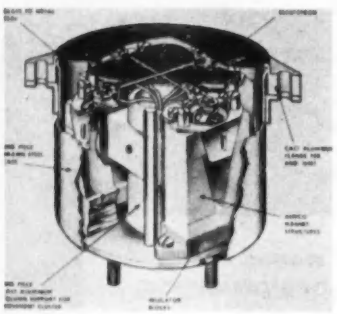


In operation, the pressure pickups, diaphragm actuated mechanisms similar to conventional airspeed and altimeter instruments, position low-friction Synchrotels which convey the information to the computer mechanism. This unit, in turn, employs the servos to drive a series of cams and synchros to develop Mach number and true airspeed information. Output data is transferred by transmitter synchros and control transformer synchros for use as desired.

The unit is presently undergoing qualification approval tests by the Air Force. *Kollsman Instrument Corp.*

Circle 47 on page 89 for more data

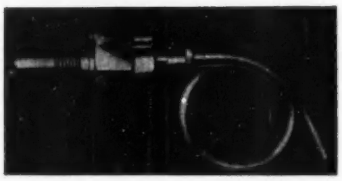
Instruments



A series of improved multi-element aircraft instruments has been announced. The series consists of single seal glass-to-metal hermetically sealed aircraft types which incorporate ruggedized D'Arsonval movements and a unique columnar construction which is said to provide greater rigidity and more precise alignment of the elements. Available as two element (model AN32E), three element (model AN33E), and four element (model AN34E) types, applications include: ammeters, voltmeters, radio navigational types (such as omni-range and ILS), temperature indicators and others. The instruments meet AND 10401 dimensional requirements for 2¾ inch dial instruments. *Marion Electrical Instrument Co.*

Circle 48 on page 89 for more data

Thermal Unit



A thermal sensing unit is now in production for use wherever temperature limit indication is required. The Plugstat provides precise thermal warning without calibration drift. Special alloy contacts assure clean make-and-break. The unit is capable of 200F overshoot from high or low normal setting. It is available also with AN connector, and is rated at ¼ ampere, 28 volts, ac or dc resistive loads. Contacts can be had normally opened or normally closed. Weight is approx. 1.5 oz. *Control Products, Inc.*

Circle 49 on page 89 for more data

Oil Scavenge Pump

Now on the market is a pump for scavenging lubricating oil from aircraft gas turbine engines. Known as Model RD 9820, the unit weighs only 0.5 lb. This scavenge pump has a rated speed of 3800 rpm, outlet pressure of 60 psi, flow of ½ gpm pumping jet engine lube oil, Grade 1005. The pumping is said to provide non-pulsating discharge and strong self-priming suction at speeds of 350 to 4200 rpm. *Lear-Romec Div., Lear Inc.*

Circle 50 on page 89 for more data

The Thompson power steering pump is an internal gear pump with integral combination flow-control and relief valve. It features uniform flow characteristics, better distribution of driving pressure, improved operating efficiencies and competitive manufacturing costs.

Thompson's hydraulic pump is used to actuate tractor implements and features pressure loaded end plates which compensate for wear and results in maximum efficiency and longer service life.

YOU CAN COUNT ON

Thompson Pumps

DIFFERENT pumps present different problems in their design, development and production. With a power steering pump it may be quiet operation; with a farm implement pump it could be the need for longer service life; always there must be dependable operation.

But, whatever the problem, Thompson is equipped to solve it. Over 50 years experience in the research and production of precision-engineered parts enables Thompson today to manufacture pumps which assure maximum performance and dependability.

In addition to maximum performance ratings, Thompson pumps are also engineered to meet competitive manufacturing costs. Our engineers will gladly work with you to design pumps for your specific application—whether you require a power steering pump, a farm implement pump, or some type industrial pump. Write, wire or phone Special Products Division, Thompson Products, Inc., 2196 Clarkwood Road, Cleveland 3, Ohio.

You can count on Thompson Products

SPECIAL PRODUCTS DIVISION

2196 Clarkwood Road • Cleveland 3, Ohio

METALS

Price of Steel Scrap Takes Upward Turn. Stocks of Slab Zinc High Despite Lower Imports. Copper Surplus Foreseen.

By William F. Boericke

Cautious Buying in Steel

Steel producers are optimistic over the general outlook for their industry for the near term but admit that customers are buying cautiously and watching their inventory position closely. With steel supplies adequate or abundant for most products, orders are being placed only for 30-60 days in advance of delivery in contrast with 90-120 days that were cheerfully given earlier in the year. As a result, it becomes increasingly difficult to appraise the demand for more than a limited time ahead.

It now seems probable that steel production rate will slip close to 90 per cent of capacity by the end of the year and possibly lower. By the middle of November the rate had dipped to 93 per cent, a 14 per cent decline from a year ago. This of course does not mean that the actual tonnage of steel produced is less, as steel production capacity is much higher now than in 1952. A record output of about 111-112 million tons for 1953, some 7 million tons more than the former high of 1951, appears assured.

Because of the changeover period for the automobile manufacturers and admittedly higher competitive selling ahead, Detroit will ask for less steel in December. A lower demand is expected from appliance manufacturers until 1954. But thus far base prices have been well maintained by the steel mills. Some confusion was caused when Great Lakes Steel cut special types of steel $2-13 per ton, but this was said to have been done only to meet competition from freight absorption by other big mills and to eliminate premium prices on some special steels, and not to inaugurate a price war.

Scrap Price Recovers

There was satisfaction in the sharp price reversal for steel scrap, which after plummeting to $31-32 per ton, recovered to $38 early in November. This was taken as a good augury for continued steel demand. No doubt some credit must be given to the Government order that freed scrap for export which resulted in bringing some heavy orders from buyers abroad. Scrap dealers accordingly were less eager to part with supplies at recent depressed prices.

The feeling also prevails that defense orders will level off and may even improve. Some steel products are still in better than average demand, notably oil country goods, hot-rolled bars, and structurals. Tin plate business looks encouraging and electrical equipment makers expect to order more steel than ever in 1954.

Elimination of EPT Favorable for Steel Profits

Even if the production rate drops to 85 per cent for the industry, the efficient producers are assured of profitable operations. A 100 per cent capacity rate has meant the enforced use in many cases of obsolete, high cost equipment and much overtime, which could be eliminated by confining operations to the new equipment upon which the industry has spent hundreds of millions. Elimination of excess profits tax in 1954 will prove a windfall in maintaining profits at satisfactory levels, unless some producers attempt to pass along part of the saving by offering lower prices to get business in a competitive market. The United Steelworkers no doubt will also be looking for their cut when EPT fades out.

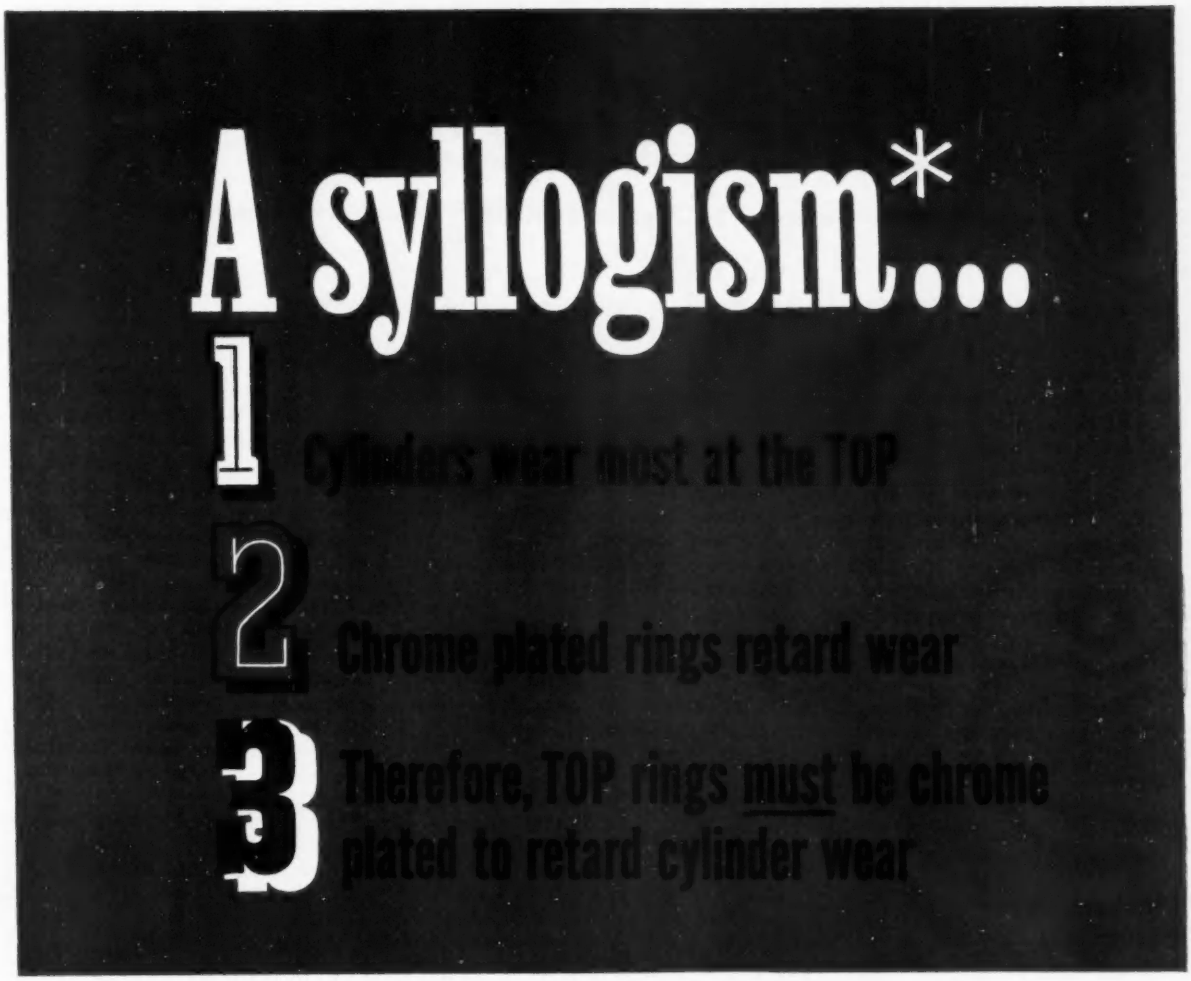
Cobalt Up, Tungsten Down

Divergent price trends show up for cobalt and tungsten, important alloying metals. African producers quietly advanced their price for cobalt early in November from $2.40 to $2.60 per lb. Long delay in bringing a new domestic cobalt mine into production has strengthened the market. Tungsten on the other hand is in over supply and has dropped to $28 per short ton unit WO3. This is less than half the price of $63 that is guaranteed domestic tungsten producers by the Government which will hold through 1958. With so great a price disparity all domestic output necessarily goes into the stockpile. Some dealers blame the price decline on skimpy buying by the steel companies that, they declare, have cut their inventories to a very low level.

Nickel Still Scarce

Both allocations and end-use restrictions on nickel were ended because of pressure by Commerce Secretary Weeks, backed by the steel, non-ferrous alloy, and plating industries. The Office of Defense Materials didn't like it as the metal is not yet plentiful enough to supply all civilian demands. It would appear, however, that with important new Canadian production scheduled to begin early in 1954 that danger of serious shortage is minimized.

(*Turn to page* 132, *please*)



IT'S LOGIC LIKE THIS THAT HAS CONVERTED 27 LEADING ENGINE MANUFACTURERS TO CHROME PLATED TOP RINGS...

●

...AND *25 OUT OF THE 27* LEADING ENGINE MANUFACTURERS USING CHROME PLATED RINGS SPECIFY

Perfect Circle

The standard of comparison

The application of solid chrome plating to piston rings, as perfected by Perfect Circle, more than doubles the life of pistons, rings and cylinders. Performance data will be furnished on request. Write Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Ontario.

***Deductive reasoning**

Observations

By Joseph Geschelin

Brussels Fair

At the National Machine Tool Builders' Annual Meeting at Boca Raton (which we attended) we heard an interesting report on the recent machine tool shows in Europe. Through the medium of Marshall Plan and ECA funds, we have succeeded in building up an enormous machine tool industry in Germany, France, Italy, Switzerland, and England. Germany alone reportedly has about 600 machine tool concerns—many more than it had prewar. At least 3000 machine tools were exhibited at the Brussels Fair. Net result of the expenditure of our tax moneys in this fashion is that not only have domestic machine tool builders lost some export business, but they face the competition of foreign producers for better or for worse.

Machine Tool Forum

In discussing the growth of JIC as well as NMTBA standards for electrical equipment, wiring, and hydraulics, one of the speakers congratulated the Westinghouse Electric Corp. for its ever growing cooperation with machine tool builders and users. Reference was made to the annual Machine Tool Electrification Forum held by Westinghouse as a means of disseminating information concerning new developments in electronics, motors, drives, and controls.

National Center

Announcement was made at the NMTBA convention about the establishment of a National Center on equipment policies at Illinois Institute of Technology. Courses have been set up for the study of engineering economics in equipment buying and replacement. While intended primarily for the machine tool industry, here is a signal opportunity for training engineers in the automotive industries in the latest techniques which may have an enormous influence upon economy in buying practices.

What's Old

Like the proverbial story of which came first—the chicken or the egg, there is the perennial question of what is an old machine tool. When does it have to be replaced. Is it old at 10 years or 15 or 20. We believe that age means little except as a means of checking. What does count is obsolescence and, of course, physical condition. The point is that although many kinds of metalworking machinery are designed to give a great many years of useful life, the true test is whether or not a company is losing money by not installing a more modern piece of equipment. In the automotive industries, obsolescence may take place when an expensive piece of machinery is less than a year old. If a better method becomes available, and if it promises to reduce cost, the present machine must give way—and it does. No manufacturer, in a mass production industry, can afford to operate equipment that will not pay. As a matter of fact it takes only a small saving per piece to pay for any kind of new equipment when pieces are made by the thousands and hundreds of thousands. Engineering economics rather than physical age determines the useful life of machine tools.

Equipment Survey

One of the highlights of the NMTBA meeting was the presentation of the report on the age of equipment in the metalworking industries The report purports to show that 55 per cent of machine tools in the automobile industry are 10 years old or older. Its author made quite a point that in the light of the figures, the talk of technological advance and automaticity in the automotive industries was just a myth. If it is indeed a myth then the writer has wasted many years since the end of the war visiting and recording the accomplishments of Ford, General Motors, Chrysler, Studebaker, Nash, Packard, Hudson, and many others who launched major production facilities since the end of the war. A more rational explanation of obsolescence is that by sheer weight of numbers of equipment that has been in use in the Detroit area, statistically at least, the older equipment outweighs the new facilities. But you can't use the same old yardstick on the new equipment. For here we have the new phenomenon of enormous transfer machines—counted as one unit—replacing from ten to thirty conventional machines. The fact still remains that the automobile industry is different. It has embarked on an extensive and widespread new plant and equipment program—rather than a replacement program. The yardstick of replacement, although applicable in the automotive industries as a matter of course, is much more potent in the other metalworking industries where there is little new construction and where modernization depends entirely upon replacement of old equipment.

Stand-By Power

One of the speakers at the NMTBA convention made an important suggestion regarding preventive measures in the event of fire or disaster. He recommended the installation of package powerplants to serve as stand-by power in the event of power failure. Many plants, particularly those in outlying areas, have stand-by powerplants as a matter of course. It appears desirable for other plants, even those within large cities, to consider installation of such equipment for a rare emergency. These packaged powerplants—either gasoline or Diesel—are fully equipped with automatic controls and will start automatically when called upon.

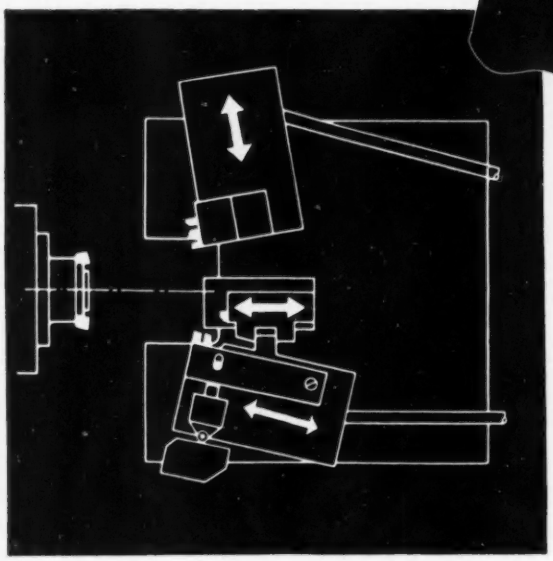
Chicago Display

According to a story in the *Chicago Sun-Times* (Nov. 19, 1953), the South Side Planning Board held a meeting at which they discussed a proposal to erect an enormous convention hall on the South Side. The auditorium, as

(*Turn to page* 122, *please*)

the GISHOLT SIMPLIMATIC

Works All the Angles...



THE SIMPLIMATIC's large platen table provides a platform upon which tool slides may be mounted in any position. Above is a typical tool layout—designed for machining bevel gear blanks. Angular feeds are no problem. Compound slides are seldom needed. Write for literature.

COMPLETE FREEDOM IN PLACING TOOL SLIDES

...enables you to meet your own specific needs for high-speed automatic machining... and do it with a standard machine.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round or partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY

Madison 10, Wis.

TURRET LATHES · AUTOMATIC LATHES
SUPERFINISHERS · BALANCERS · SPECIAL MACHINES

News of the AUTOMOTIVE AND AVIATION INDUSTRIES

Continued from Page 39

of 767 mph and an average speed of 754.98. The previous world record, set by a Navy F4D Skyray over a three kilometer course, was 753.4 mph.

Hudson Reports Loss For 1st Nine Months

A deficit for the first nine months of this year indicates difficulties Hudson has encountered because of strikes in the tool and die industry and the shortage of automatic transmissions resulting from the General Motors fire, according to the nine months financial report.

For the first three quarters of this year Hudson had a consolidated net loss of $838,100 compared with net income of more than $6.24 million for the same period a year ago. The loss would have been even greater this year had it not been for an estimated tax credit of $760,352, indicating an operating loss for the nine months of more than $1.5 million.

Chrysler to Expand Canadian Plant

Chrysler Corp. of Canada plans a $21 million expansion of facilities at its plant in Windsor. It will consist primarily of a large addition to the present engine plant to add more than 300,000 sq ft of area and permit doubling the capacity for V-8 engine production.

The expansion program is in addition to a $20 million project announced last February and now near completion. The latest project will be completed by the end of 1954. Chrysler also is planning to expand its body-building facilities in Canada.

No Further Word Yet on Ford Special Div.

At press time, no further information was available regarding the plans of the recently established Special Product Div., of the Ford Motor Co. The division, headed by William C. Ford, has its own product engineering, finance, manufacturing, purchasing, sales and industrial relations departments.

There has been some speculation that Ford might recreate its "Continental" series, which was discontinued in 1948. No confirmation for this report has appeared, however, and it is reasonable to assume that a further definite statement regarding a new car will not be made until manufacturing and sales facilities are well established and ready for business.

Power Steering Unit Ready for Output by Chrysler

According to reports, Chrysler Corp. will start making its own power steering unit for Chrysler and De Soto cars this month. For some time Chrysler has been tooling up its Trenton, Mich., plant for the job (see AUTOMOTIVE INDUSTRIES, July 1, p. 35).

It is expected, however, that Gemmer Manufacturing Co., which currently makes power steering units for the two above cars, will be retained as a partial source of supply until next March. Although Chrysler will make all the major parts for its unit at the Trenton plant, purchase of hydraulic pumps from Eaton Manufacturing Co. will be continued, it is said.

For the time being, at least, Dodge and Plymouth will continue to buy power steering units from outside sources. In time to come, however, it is believed that these two makes will also be supplied by the corporation itself. At the present time, the Dodge V-8 uses the Ross power steering unit, while the Dodge Six and Plymouth employ the Monroe unit.

Latest Packard Net Double 1953 Level

Packard's earnings for the first three-quarters of this year total more than $6 million, or approximately double the net for the same period a year ago. Sales for the first nine months are more than double those for the same period a year ago, totaling $283.89 million.

Oliver Corp. Takes Over Farm Machinery Producer

Oliver Corp., Chicago, has acquired the Be-Ge Manufacturing Co. of Gilroy, Calif., and will operate it as a wholly-owned subsidiary. The latter firm manufactures farm machinery and construction equipment.

Oliver, a leading farm and industrial equipment manufacturer, is said to have been looking for a West Coast site for a number of years.

1953 RETAIL CAR SALES BY PRICE GROUPS*

NUMBER OF CARS

	September				Nine Months			
	1953		1952		1953		1952	
Price Group	Units†	% of Total	Units†	% of Total	Units†	% of Total	Units†	% of Total
Under $2,000	277,116	61.37	169,106	53.56	2,395,623	55.13	1,554,515	51.96
$2,001 to $2,500	119,011	26.35	85,803	27.19	1,224,709	28.18	904,722	30.24
$2,501 to $3,500	43,561	9.65	44,079	13.96	552,259	12.71	397,651	13.29
Over $3,500	11,887	2.63	16,723	5.30	173,113	3.98	135,073	4.51
Total	451,575	100.00	315,711	100.00	4,345,700	100.00	2,991,961	100.00

DOLLAR VOLUME OF SALES*

	September				Nine Months			
	1953		1952		1953		1952	
Price Group	Dollars	% of Total	Dollars	% of Total	Dollars	% of Total	Dollars	% of Total
Under $2,000	$493,477,277	53.50	$298,601,484	44.60	$4,280,091,963	48.64	$2,746,134,505	43.45
$2,001 to $2,500	265,712,310	28.80	190,674,171	28.48	2,733,331,635	29.79	2,005,340,288	31.73
$2,501 to $3,500	119,614,756	12.97	118,578,003	17.71	1,815,396,963	16.51	1,073,282,010	16.98
Over $3,500	43,656,706	4.73	61,635,696	9.21	648,797,585	7.07	495,198,967	7.84
Total	$922,461,049	100.00	$669,489,354	100.00	$9,177,618,146	100.00	$6,319,955,771	100.00

*—Calculated on basis of new car registrations, as reported by R. L. Polk & Co., in conjunction with advertised delivered price at factory of four door sedan or equivalent model. Does not include transportation charges or extra equipment.
†—New registrations of American made cars only. Does not include imported foreign cars.

NEWER

Than Nuclear Fission !

METERED STEEL REACTOR

Now Allows You To Specify Your Own Piston Clearance!

CONFORMATIC PISTONS

...have met by carrying the strength ... the steel insert we can pre-de... minimum piston to expansion and contraction ... engine clearance specifi...

CONSTANT CLEARANCE over the entire temperature range from —20° F. to 200° F. Closer clearances than ever before possible without danger of scuffing or seizing.

...ALUMINUM PRODUCTS

New Nash Rambler Sedan

(*Continued from page* 61)

of 7.3 to 1, and a piston displacement of 195.6. Improvements have been made in the connecting rods, the main bearing oil seals, the crankshaft and camshaft, the exhaust manifolding, and the ignition system.

Dual-Range Hydra-Matic and automatic overdrive are available as optional extra cost equipment, and synchromesh transmission is standard equipment.

The new 1954 Ambassador and Statesman models feature exterior and interior styling refinements, and many mechanical advancements. The major mechanical changes in this series are: a new Statesman Dual Powerflyte engine, featuring dual carburetors as standard equipment; increased horsepower in the Ambassador Super Jetfire engine; new power steering and power brakes, offered as optional equipment; and electrically operated window lifts, available at extra cost.

Styling refinements include a new dual die-cast grille; a continental rear tire mount offered as standard equipment on all Ambassador and Statesman custom four-door and Country Club hardtop models; a redesigned and improved dash panel; and new exterior solid and two-tone color selections, and interior upholstery and trim combinations.

The new Statesman "Dual Powerflyte" engine has an aluminum cylinder head and two single barrel carburetors. With a compression ratio of 8.5 to 1, its horsepower has been increased to 110. It is a six-cylinder L-head engine that can be operated on regular gasoline. The Dual Powerflyte engine also features better distribution of fuel-air mixture, increased breathing capacity, and a redesigned exhaust system.

The horsepower of the Ambassador Super Jetfire six-cylinder overhead valve engine has been increased to 130, with a compression ratio of 7.6 to 1. This high compression engine is designed to operate efficiently on regular gasoline.

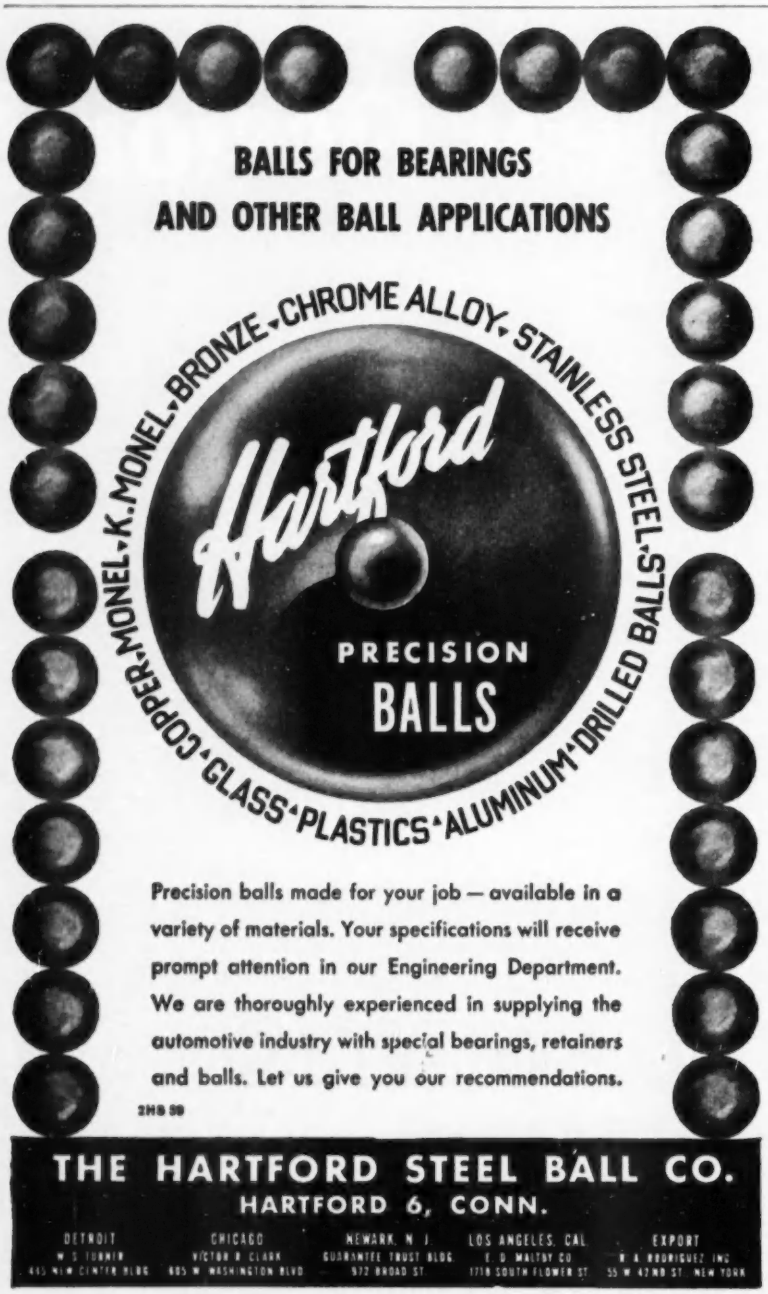
The LeMans Dual Jetfire engine is offered as optional equipment on all Ambassador models. This six-cylinder overhead valve engine is equipped with an aluminum cylinder head, with a compression ratio of 8 to 1. It develops 140 hp at 4000 rpm.

Power brakes are available on both Ambassador and Statesman models equipped with Hydra-Matic as optional equipment. The unit consists of a power cylinder, a piston with built-in control valve, a hydraulic section, including a hydraulic fluid reservoir and a vacuum reservoir.

Linkage type power steering is available as optional equipment on both models.

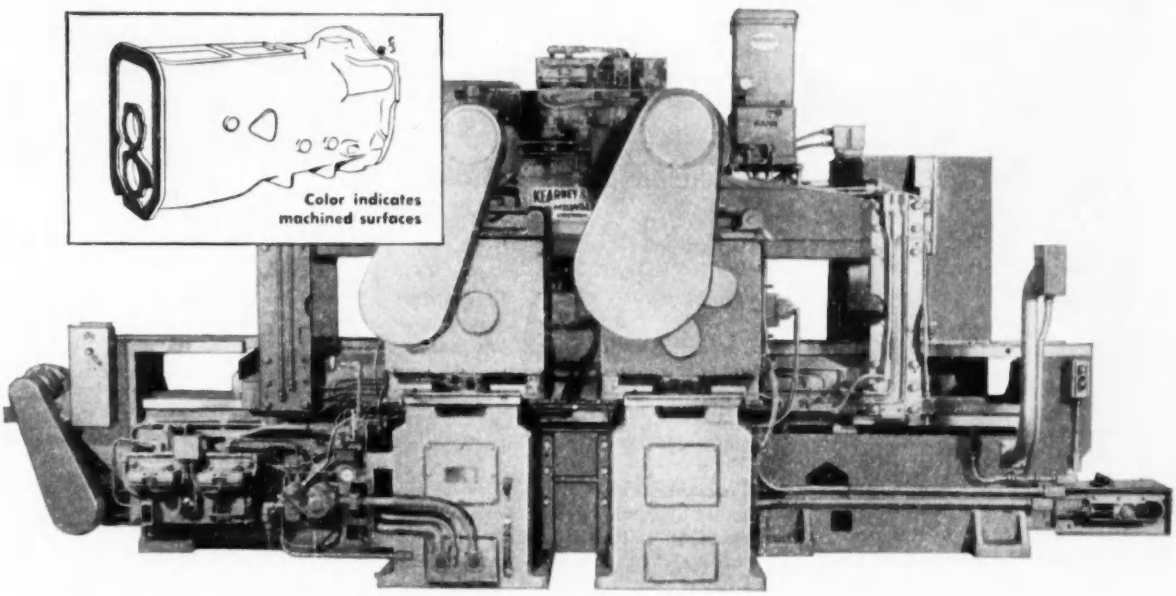
Dual-Range Hydra-Matic drive and automatic overdrive are available on all 1954 Ambassador and Statesman models as optional equipment. Syncromesh transmission is standard on both models.

A new steering wheel overtake switch, called Power Pass, will be standard on Ambassador and Statesman custom models equipped with overdrive, and overdrive Ambassador models powered by the optional LeMans Dual Jetfire engine. The accelerator pedal overtake also will be standard on the same models. With the steering wheel overtake, the driver can downshift without "flooring" the accelerator pedal, thus permitting a smooth return to third gear. The accelerator overtake system can


BALLS FOR BEARINGS
AND OTHER BALL APPLICATIONS
COPPER • MONEL • K-MONEL • BRONZE • CHROME ALLOY • STAINLESS STEEL • DRILLED BALLS • ALUMINUM • PLASTICS • GLASS
Hartford
PRECISION
BALLS
Precision balls made for your job — available in a variety of materials. Your specifications will receive prompt attention in our Engineering Department. We are thoroughly experienced in supplying the automotive industry with special bearings, retainers and balls. Let us give you our recommendations.
2HS 50
THE HARTFORD STEEL BALL CO.
HARTFORD 6, CONN.
DETROIT
CHICAGO
VICTOR R. CLARK
NEWARK, N. J.
GUARANTEE TRUST BLDG.
LOS ANGELES, CAL.
EXPORT

What a saving...

Builders of Precision and Production Machine Tools since 1898



For the customer... it combined four milling operations in one machine!

THIS special 6-spindle transfer type milling machine was designed and built to keep a tractor manufacturer's production line rolling at high speed. The machine now mills opposing end faces of tractor transmission cases both flat and parallel . . . to close tolerances (.002) . . . in only 94 seconds.

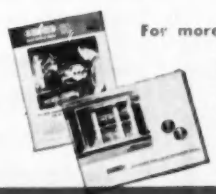
FOUR HYDRAULICALLY RETRACTING HEADS... First two heads have two spindles each for roughing. Second two heads have one spindle each for finishing.

CLAMPING MECHANISM... Large hollow workpiece is secured at each machining station by a tunnel-type hydraulic equalizing clamping fixture. This eliminates the distortion usually encountered when clamping this type of workpiece.

If you have problems that require special machinery—contact your Kearney & Trecker representative.

Capacity . . . Experience . . . Performance

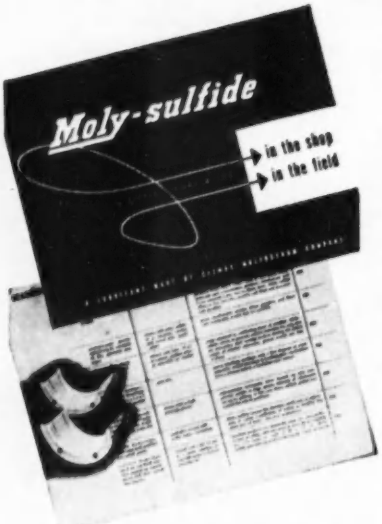
Upon completion of this $5,200,000 expansion of our Special Machinery Division, we offer you (1) unmatched facilities, (2) experience based upon more than 50 years in the design and production of special machinery, and (3) performance, best recommended by our outstanding record of successfully solving many hundreds of unusual machining problems.



For more details on this machine . . . ask for *Data Sheet No. 1002*. Free booklet, "Doorway to a proven method for solution of big and small metalworking problems" is also yours for the asking. *Write today to* SPECIAL MACHINERY DIVISION, KEARNEY & TRECKER CORP., 6784 West National Ave., Milwaukee 14, Wisconsin.

KEARNEY & TRECKER CORP. · *Special Machinery Division*
MILWAUKEE 14, WIS., U. S. A.

154 ideas on ways to use...



154 varied applications of molybdenum sulfide in the shop and in the field are described in a new booklet now available. This solid-film lubricant has demonstrated unique anti-friction properties under conditions of extreme pressure, high velocity, elevated temperature, or chemical attack.

The 40-page booklet contains the records of solved lubrication problems — some might solve your own.

Moly-sulfide
A LITTLE DOES A LOT

The lubricant for extreme conditions

Climax Molybdenum Company
500 Fifth Avenue
New York City 36 N Y

Please send me your Free Booklet on *Moly-sulfide*
Name.....
Position.....
Company.....
Address.....

MOLY

AI-12 MS-6A

also be used in emergency situations.

The new 1954 Custom Rambler 100-in. wheelbase series includes three models: convertible; station wagon; and Country Club hardtop.

All Rambler 100-in. wheelbase models are available with Dual-Range Hydra-Matic or automatic overdrive as optional equipment. Synchromesh transmission is standard equipment.

The Rambler Super Flying Scot six-cylinder L-head engine, rated at 85 hp, has a compression ratio of 7.25 to 1, and a displacement of 184 cu in. When Hydra-Matic transmission is used, the horsepower of the Rambler engine is increased to 90 and displacement to 195.6. The compression ratio is stepped up to 7.3 to 1.

Studebaker New Brakes

(Continued from page 57)

less of loading. The regular rear springs are in play up to a three-passenger load. If loading is further increased, it brings into play the second stage helper spring section. This model has a wheelbase of 116½-in., is 195⅝-in. overall length, 69¾-in. width, and is 62⅜-in. in height when loaded.

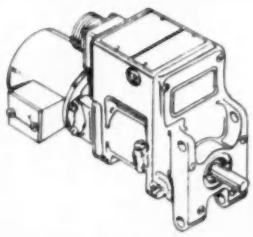
Striking exteriors have been enhanced by further refinements and accented by unique interior treatment. There are 41 standard combinations of color-styled interiors—21 cloth and color combinations in sedans, 16 in the five-passenger coupes, and four in hardtop convertibles. Twelve solid color options and 10 two-tone combinations make up the selection at the customer's option.

Other interior features include: new instrument cluster; removable rear center arm rests in hardtop convertibles and coupes; and the addition of dome lights in sports models.

Exterior features include: new grilles; bumper guards; chrome rub rails standard on all Regal sedans and Land Cruiser models; trunk lid handles of wing type with integral locks.

AUTOMOTIVE INDUSTRIES . . .
is your News Magazine of Automotive and Aviation MANUFACTURING

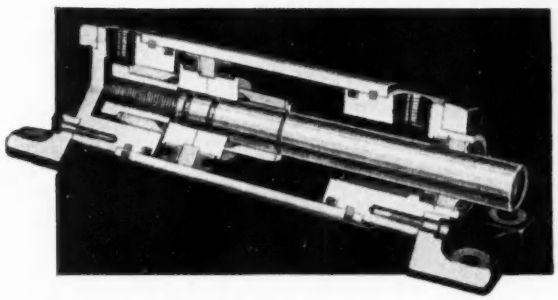
AIRBORNE ACTUATOR *for Navy's Guardian*



The ram air inlet door on this new Grumman sub-hunter is actuated by Airborne's R-412M5 Actuator. Other models and similar Airborne electromechanical units are standard equipment in many service and civilian aircraft. Their wide range of applications is evidence of their great dependability.

If you have a design problem where high power and small space are factors, see our literature in the I.A.S. Aeronautical Engineering Catalog, or write direct to us.

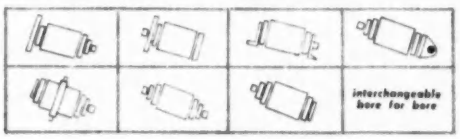
AIRBORNE
ACCESSORIES CORPORATION
1414 Chestnut Avenue
Hillside 5, New Jersey



O-M (air • hydraulic) CYLINDERS

fit where others won't!

complete range of mounting brackets



O-M's SPECIAL INTERLOCKING MECHANISM, which does away with projecting tie rods and end caps, answers the old problem of how to get the necessary power when space is a factor. O-M Cylinders require 1/3 *less installation space* than conventional cylinders with the same bore . . . and can be turned down to fit easily into the deep recesses of machine bases and equally hard-to-reach spots. They're ALL-STEEL with bearing bronze—no castings.

And O-M has the lowest coefficient of friction of *any* cylinder . . . smoother operating at low or high speeds regardless of length of stroke. End plugs tapped for universal mounting. Any one or combination of mounting brackets may be used to install *without disassembling or changing cylinder.* Easily removed, inspected, repaired.

Available in a full range of sizes (1½ to 8" bores) with standard, 2 to 1 or oversize rods. Completely interchangeable parts.

Write today for FREE catalog and complete set of ½- and ¼-scale templates showing all cylinders and mounting brackets.

14 day delivery on most sizes

SALES REPRESENTATIVES

J. NEILL ARMSTRONG
Westmont, New Jersey
BECKETT-HARCUM CO.
Willmington, Ohio
GILMORE SALES COMPANY
Detroit, Michigan
NEIL GROOM
Toronto, Ont., Canada
HACKETT BROS., INC.
No. Manchester, Indiana
H. C. HALBERT
Atlanta, Georgia
H. U. ROGNESS INC.
Minneapolis, Minnesota
IND. SALES & ENGR. CO.
Houston, Texas
IND. SALES & ENGR. CO.
Tulsa, Oklahoma
KNOX, INC.
East Walpole, Mass.
H. D. MACRAE
Rochester, New York
JAMES E. McSHANE
Phoenix, Arizona
THE MERCER COMPANY
Milwaukee, Wisconsin
WALTER NORRIS ENGR. CO.
Chicago, Illinois
PNEUMATIC ENGR. CO.
West Hartford, Conn.
P. W. RICE
Cleveland, Ohio
THE RODEN COMPANY
Cranford, New Jersey
THE RUCKER COMPANY
Oakland, California
THE RUCKER COMPANY
Seattle, Washington
THE RUCKER COMPANY
South Gate, California
T. H. SCAFFE
St. Louis, Missouri
SINTES SALES ENGR.
New Orleans, Louisiana
ROBT. TAYLOR & SON
Salt Lake City, Utah

mail coupon now!

ORTMAN-MILLER MACHINE COMPANY
1202 150th Street, Hammond, Indiana

☐ Please send latest O-M Catalog ☐ Complete Templates

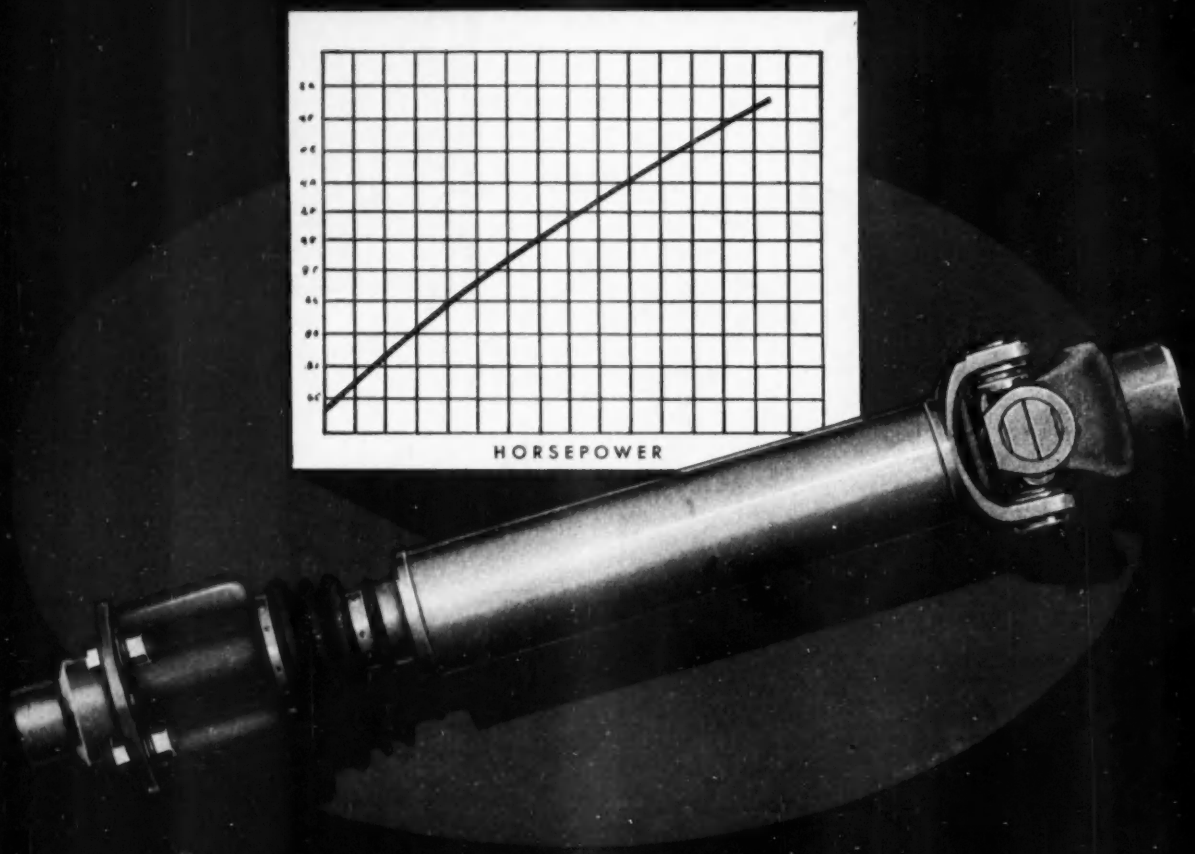
Name_____ Position_____

Company_____

Address_____

City_____ Zone____ State_____

Today's Competition for Horsepower...



...Puts Universal Joints on the Spot

Car engineers are doing a great job of stepping up the horsepower of today's engines. But every bit of new power puts added strain on universal joints. That's why the extra quality built into "DETROIT" Universal Joints is so important—they're built for today's high torque engines.

DETROIT
UNIVERSAL JOINTS

UNIVERSAL PRODUCTS COMPANY, Inc., Dearborn, Michigan

Lessons from the Livonia Fire

TOP executives of industry are undoubtedly wondering whether they have, in their own plants, a situation such as the one illustrated by the General Motors fire at Livonia, Mich., last August. To them the following may be said:

Take a fresh look at processes of your plants. At least make a spot check. Start by considering the relative combustibility of raw materials and the problems of handling them. Find out if in any important respect the methods of handling and storage deviate from a reasonable safe practice.

If your staff people can't satisfy you, it would be money very well spent for you to hire a competent outside expert. Use the same approach for each manufacturing process and for the warehousing of finished products.

Evaluate each unit not only from the point of view of the value of that unit but based on its part in the operation as a whole.

Have someone prepare for you a list of all large buildings in your plants. Ask them to include large outdoor storage areas in this list. The list should include all buildings of 40,000 sq ft or more, all of 5000 sq ft which are not completely protected by automatic sprinkler systems, and all buildings housing materials or processes of which there are no readily available duplicates.

The list of buildings over 40,000 sq ft will flag your own cases where single fire areas may be excessive or where the total amount of combustible per sq ft may be unreasonably large considering the arrangement of the building and the type of building construction which has been chosen for it.

There must be a very unusual set of circumstances to justify the use of any manufacturing area without sprinkler protection and the list of unsprinklered buildings should be carefully reviewed.

In checking on sprinklered property look into the details of water supply including gravity tanks, yard systems, fire pumps, central station supervision.

Check the organizational setup for handling fire prevention and fire protection matters in your companies and appraise the competence of personnel assigned to these responsibilities.

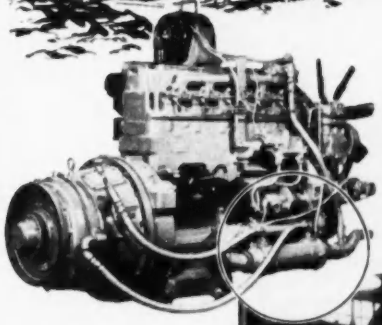
Check also the measures by which central management keeps posted on fire conditions in all plants of the companies associated in the central management. In the individual plant, find out if there is a fire protection supervisor, a routine for inspection and maintenance of fire protection equipment, a properly directed and trained fire brigade, and if suitable arrangements have been made with the public fire departments.

Each department should have a program for promptly controlling small fires, for protecting records, and for emergency evacuation of the department. Check employee attitudes toward these measures.

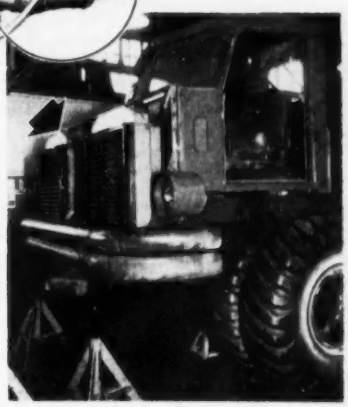
The above is an extract from an article which appeared in the QUARTERLY OF THE NATIONAL FIRE PROTECTION ASSOCIATION, October, 1953.

YOUNG COOLS THE WORLD'S LARGEST TRUCK

Above: Dart 60—the world's largest truck . . . cooled by Young Radiators and Young Heat Exchangers.



Left: One of two Young Type "F" Shell and Tube Heat Exchangers (circled) which cool Diesel fuel circulating through twin torque converters.



Right: Two Young standard-type "Mono-Weld," welded steel, Radiators which cool dual 350 hp Diesel engines. They feature special heavy headers of reinforced steel, with supply and return tanks bolted together. Reinforced with X cross members as a frame.

Whether your requirements vary from lightweight, efficient Stamped Tank Radiators to huge, rugged welded steel units, Young can design and manufacture the equipment needed to provide the proper heat transfer. Where combinations of jacket water, lube oil, torque converter fluid, supercharger air, compressed gases, etc. must be cooled, Young offers a *single source* for units *engineered to work together.*

YOUNG RADIATOR COMPANY

Dept. 103-M, Racine, Wisconsin
Plants at Racine, Wisconsin and Mattoon, Illinois

YOUNG

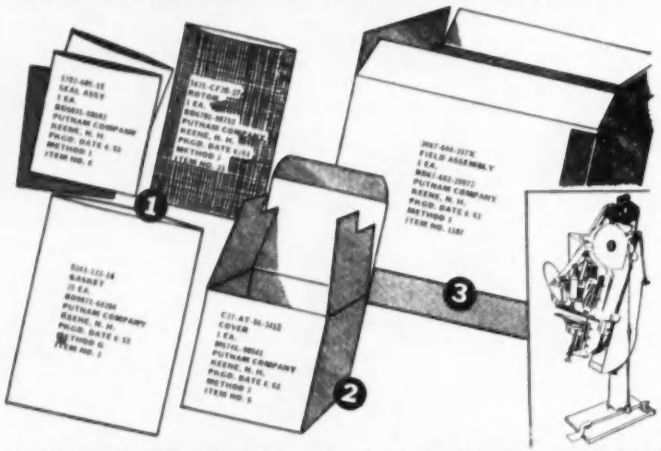
Heat Transfer Products for Automotive, Agricultural, Industrial, Gas and Diesel Engine Applications

Heating, Cooling, Air Conditioning Products for Home and Industry

Leaders in Heat Transfer Engineering for more than 25 years

MARKEM SOLVED THIS MARKING PROBLEM

IDENTIFICATION MARKING
FOR CONTRACT AND OVERSEAS PACKING



In contract and export packing of parts, assemblies, etc., certain JAN specifications call for three packaging stages: (1) enclosure in scrimback or polyethylene lined *heat sealing* envelope, (2) intermediate packing in a folding box, (3) final packing in corrugated carton. Each of these three types of containers must be marked for instant and *permanent* identification. Many manufacturers, dissatisfied with conventional marking with crayon, stencil, labeling or other form of hand stamping, have not only found great savings in time and money, but also obtained more legible, longer lasting identification using a Markem Method. *One* Markem machine (with appropriate Markem type and Markem ink) prints desired information on *all three* containers. The vapor barrier of the envelope is not broken. Desired information is changed rapidly. By printing quantities of containers as and when needed, inventory problems are minimized. In this way, the Markem Method insures *positive identification* when the items reach their destination.

MARKEM® MARKS THEM ALL

CAN MARKEM HELP YOU? Identification printing for contract and overseas packaging is but an example of how Markem solves industry's marking problems. Markem has been providing industry with production techniques and equipment to identify, decorate or designate its products, parts and packages since 1911. Markem also provides technically trained men who are available in your area to assure *continued* satisfaction with Markem methods and equipment.

When *you* have a marking problem, tell us about it and send a sample of the item to be marked. Perhaps a complete Markem Method has already been developed to solve your problem. If not, Markem will work out a practical solution.

Markem Machine Company, Keene 8, N. H., U.S.A.

MARKEM ...TO MAKE YOUR MARK

Body Engineers

(*Continued from page* 49)

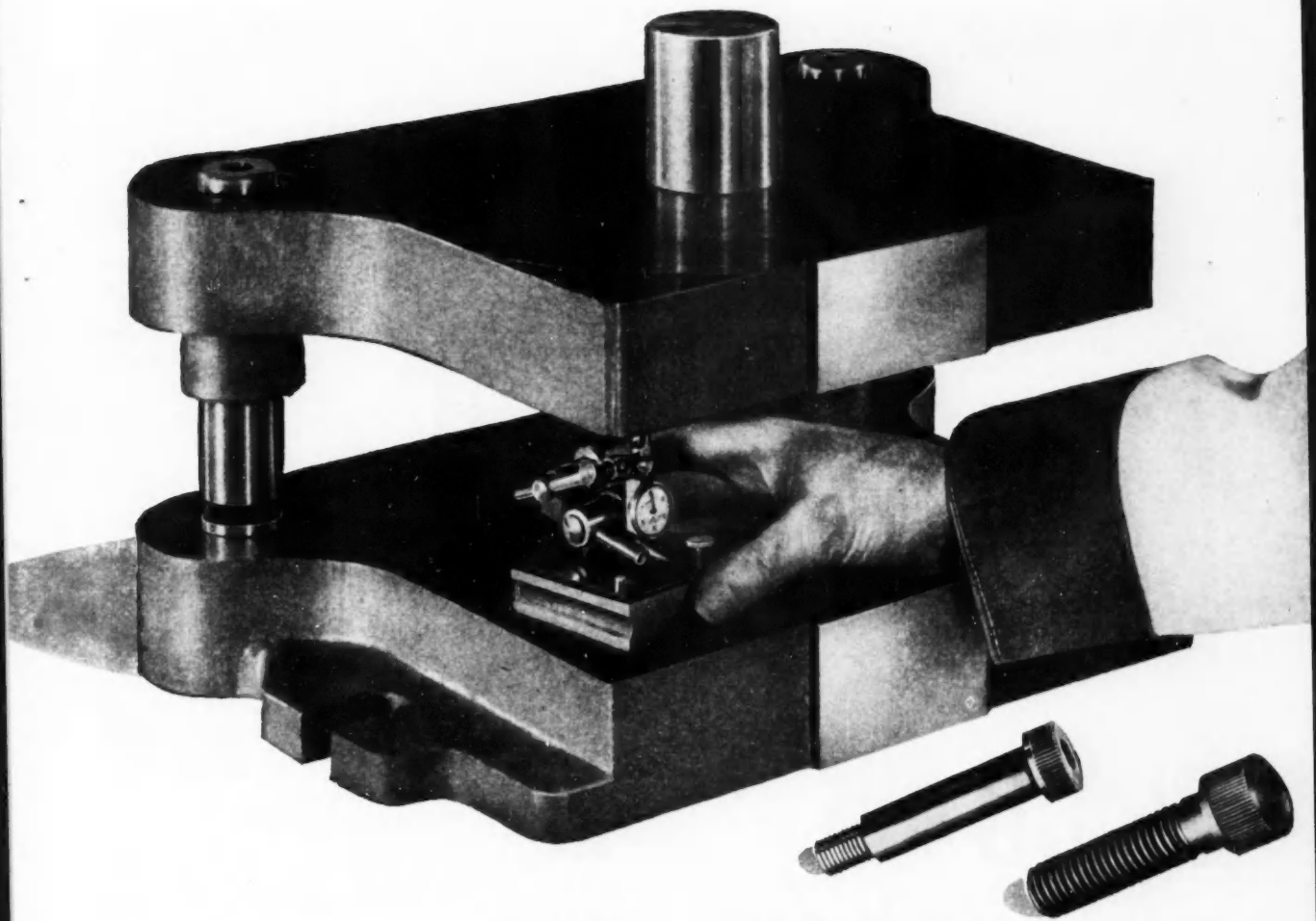
this source a flexible drive cable could be run to the self-contained air conditioning unit.

Two excellent papers were presented at the session on purchasing and body cost engineering. F. G. Force, supervisor of central estimating for Chrysler Corp., explained the general functions and procedure of cost estimating as a coordinator for the engineering, production and purchasing division. In concluding he stressed that body cost estimating today is based on sound, fundamental procedures.

Various economies that can be incorporated in body designs were presented by John M. Clark, purchasing agent for the Detroit Division of the Budd Co. Many could be accomplished by coordination of engineering and purchasing, but this seems to be lacking in industry, he stated.

Interesting displays of body equipment and engineering services were another feature of the convention. There were 33 exhibitors, consisting of The Randall Co., Presstite Engineering Co., Motor Products Corp., Kish Plastic Products, Inc., Libby-Owens-Ford Glass Co., The Stubnitz-Greene Spring Corp., Soss Manufacturing Co., Tinnerman Products, Inc., Engineering Reproduction, Inc., Hupp Corp., B. F. Goodrich Co., Keuffel and Esser Co. of New York, Woodall Industries, Inc., United Carr Fastener Corp., Robin Products Co., Trico Products Corp., Prestole Corp., The Universal Wire Spring Co., Gits Molding Corp., Shakeproof Division of Illinois Tool Works, American Bosch Corp., Creative Industries of Detroit, Textileather Corp., Owens-Corning Fiberglas Corp., Getsinger-Fox Co., Pittsburgh Plate Glass Co., American Forging and Socket Co., Renauld Plastics, Inc., Capitol Engineering Reproduction Co., Douglas and Lomason Co., Burlington Mills, Inc., Eaton Manufacting Co., Reliance Division, and The Anderson Co.

AUTOMOTIVE INDUSTRIES . . .
is your News Magazine of Automotive and Aviation
MANUFACTURING



DIEMAKERS DEPEND ON DANLY FOR DIE SET ACCURACY

When it comes to meeting the precision requirements of the finest die work, diemakers everywhere *depend on Danly* Die Sets and Danly Diemakers' Supplies for accuracy. Precision machining, grinding, lapping and honing provide smooth, long-wearing surfaces with dimensional accuracy held within extremely close tolerances. On every component part, rigid inspection standards guard Danly quality.

Danly accuracy saves countless hours in the die shop, makes tooling-up much faster, insures longer production runs at lower cost. Why not bring Danly into your diemaking plans and get the results you're looking for. Remember, there's a Danly Branch near you. They're stocked for immediate delivery.

Call Your Local Danly Branch Today!

***CHICAGO** 50—2100 S. Laramie Ave.
***CLEVELAND** 14—1550 East 33rd St.
***DAYTON** 7—3196 Delphos Ave.
***DETROIT** 16—1549 Temple Ave.
***GRAND RAPIDS** 113 Michigan St., N.W.
INDIANAPOLIS 4—5 West 10th St.
***LONG ISLAND CITY**—47-28 37th St.
***LOS ANGELES** 54—Ducommun Metals & Supply Co., 4890 South Alameda
MILWAUKEE 2—111 E. Wisconsin Ave.
***PHILADELPHIA** 40 511 W. Courtland St.
***ROCHESTER** 6—33 Rutter St.

**Indicates complete stock*

GMC Trucks For 1954

(*Continued from page 66*)

lengths in 11 western states, GMC offers a 72-in. bumper-to-cab dimension on the following COE models: F-630-42; DF-660-47; F-660-50; and six-wheelers—FW-620-42; DFW-620-47.

Finally, there is the introduction of the so-called Silent Power muffler, said to be the first in the industry to eliminate exhaust noises, thus providing a positive answer to the agitation as to truck exhaust noises.

The important story lies in the offering of the 248 cu in. GMC engine as standard equipment on all models 100 through 250. It replaces the 228 engine, used heretofore, boosting the entire light line to 125 hp. As an option GMC has an "economy" version of the 248 engine, rated at 115-hp, and embodying carburetor modifications said to promote increased fuel economy.

The 100 series is said to gain still further economy from a 3.9 to 1 axle ratio; while the PM-150-24 will offer 5.14 to 1 axle ratio as optional, and 4.57 to 1 as standard equipment. Another interesting optional feature is 16-in. dual tires on PM-150-24 models, and 9.00-20 tire option on the 350 series, providing increased capacity combined with lower loading height.

An added starter this year is a new light duty model 350 with GVW rating of 16,000 lb, available in either conventional or COE models. It is powered with the 270 cu in., 130-hp engine.

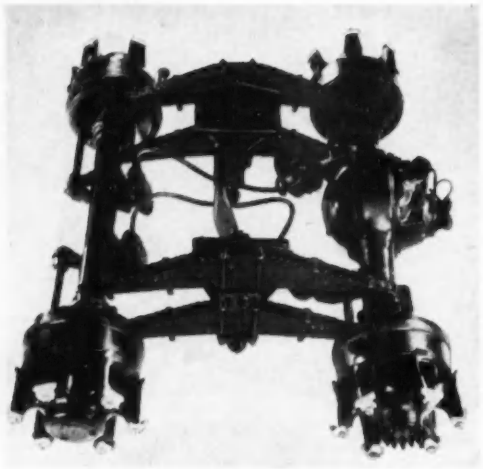
The heavy duty line features new COE and conventional models in the 660-50 four-wheelers, offering lighter-weight, lower-priced replacements for the 740 and 750 series.

All six-wheel conventional and COE models, except 950 and 970 models, have 8- and 10-speed Fuller Roadranger transmissions as standard equipment to afford greater flexibility in tractor and truck wheelbases. Five-speed main and auxiliary transmissions are optional equipment on longer wheelbase models.

The new FW-620-42 gasoline-powered models, and DFW-620-47 Diesel models are offered in COE tandem axle drive tractor and truck styles to meet the special requirements of states with a 45-ft limit. These models have a rating of 60,000 lb GCW and are equipped with a 32,000-lb double-reduction tandem axle with inter-axle differential.

The heavy duty line offers across the board such innovations as swinging front access doors on COE's, for ease of maintenance; overhead exposed individual windshield wipers; and modified engine accessory locations. Directional signals are being made available for the first time as a factory option on all models, featuring a new type signal switch of positive self-cancelling type with flashing light indicator.

In the light line, pick-up bodies have been redesigned to effect increased loading capacity, lower loading height, and a grain-tight, sand-tight, tail gate. Box capacity has been increased to hold from 8- to 11-cu ft extra cargo, depending upon wheelbase. Similarly, platform and stake bodies have been redesigned for greater height, width, and length, while loading heights have been dropped as much as three in.



GRICO

assures greater load capacities and longer tire wear by building tandems

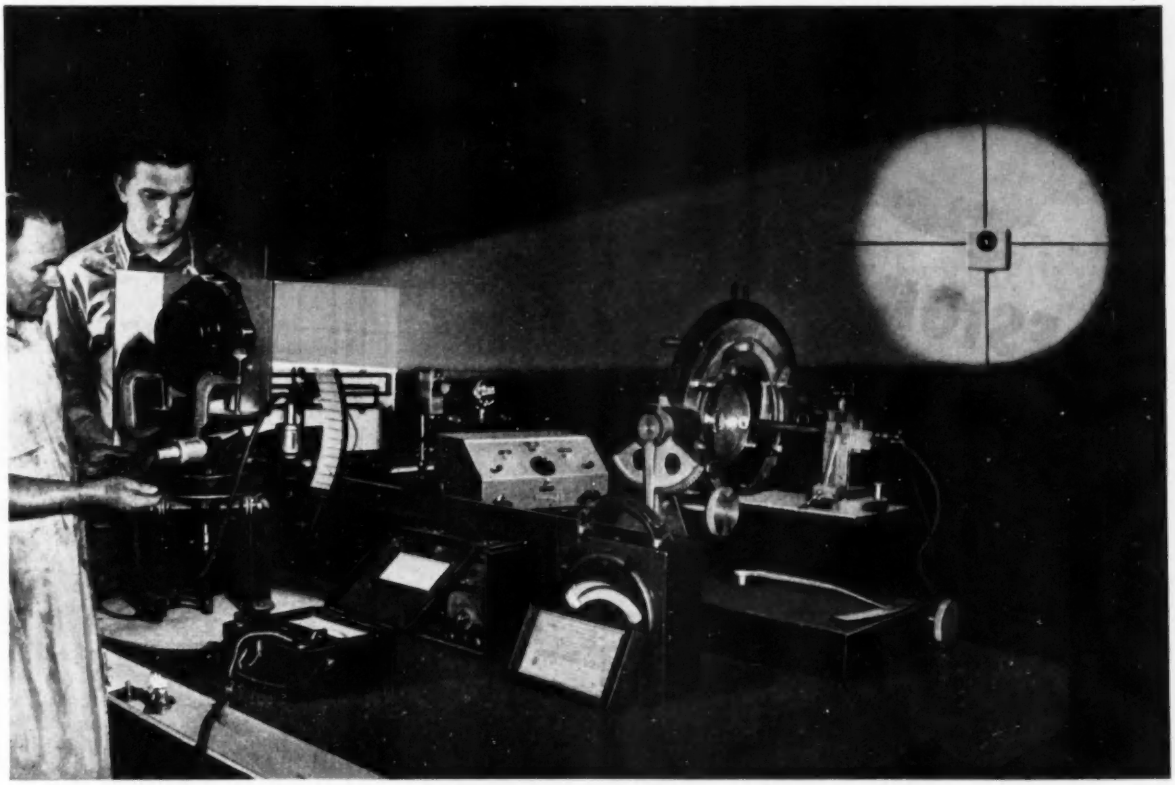
With TUTHILL ALLOY STEEL SPRINGS

GRICO Two Axle Drive Co. knows that TUTHILL SPRINGS stand up under continuous heavy hauling, load and road jolt, extreme stress, long service. Their tremendous strength and dependable quality contribute to the effective engineering of this giant among tandems. TUTHILL SPRINGS can serve *you* better, too!

TUTHILL skill in solving special load problems is at your service. For unusual *or* conventional installations . . . *consult* TUTHILL *first!*

TUTHILL SPRING CO.

760 WEST POLK STREET • CHICAGO 7, ILLINOIS



From HALL'S Laboratory Comes Better, Safer Lighting for Transportation

In this HALL lighting laboratory, highly skilled technicians study optical forms and sources of light. Working with specialized equipment they conduct various tests to assure maximum efficiency from HALL-designed lighting. Complex prisms, flutes, reflectors, light sources, intricate optics and exacting specifications all contribute to the C. M. HALL LAMP COMPANY'S never-ending search for better, safer *Lighting for Transportation*.

States' Approvals Required

States from coast-to-coast set high standards which all transportation lighting must meet. If official approvals lag behind production, motor vehicle manufacturers must know that approvals are forthcoming. The slightest error in engineering or design would mean delays and costly revisions. In its 42 years, HALL has never failed to earn State approvals!

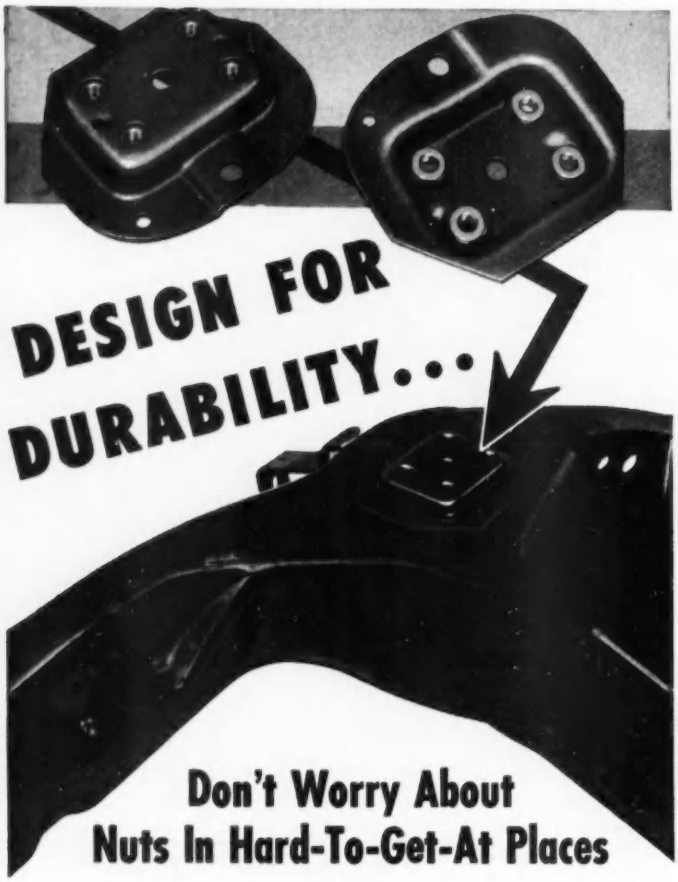
All C. M. HALL LAMP COMPANY customers benefit from this fully equipped laboratory, the only one of its kind in the heart of the automotive industry.

Bright-spot in the Transportation Center!

C.M. HALL Lamp Company — *Vision for Transportation*

1035 EAST HANCOCK AVENUE • DETROIT 7, MICHIGAN

and its wholly-owned subsidiary INDIANA DIE CASTINGS, INC. ELWOOD, INDIANA



Don't Worry About
Nuts In Hard-To-Get-At Places
use
MIDLAND
Welding Nuts

THIS IS ALL YOU DO—Just insert collar of Midland Welding Nut in hole for bolt or screw, resistance weld the Nut in place, and the *nut is there for the life of the job.* Nuts can be automatically fed to the welder. No time wasted or trouble screwing-on nuts in hard-to-get-at places. Write for facts about these better connections at *less cost.*

The MIDLAND STEEL PRODUCTS COMPANY
6660 Mt. Elliott Ave. • Detroit 11, Michigan
Export Department: 38 Pearl St., New York, N. Y.
Manufacturers of
AUTOMOBILE AND TRUCK FRAMES
AIR AND VACUUM POWER BRAKES
AIR AND ELECTRO-PNEUMATIC DOOR CONTROLS

Highlights of SAE Meetings

(*Continued from page* 72)

valve life. The results show that significant improvements were obtained by the use of these materials. With N-155, a 75 per cent improvement in valve life occurred. Hastalloy X showed a 200 per cent improvement in valve life and the valves after being removed from the engine were found to be in excellent condition and capable of additional running.

Due to the many factors affecting the performance of an exhaust valve, it is impossible to prescribe a universal valve design or material. For example, the valves which proved most effective in a 4¼ by 5 in. uniflow engine gave inferior performance in a 5.0 by 5.6 in. engine of similar design. The valves which failed prematurely in the former engine proved most satisfactory for the latter. In fact, in the same engine series it is necessary to have several different designs of valves made of two different materials in order to obtain the best performance for a particular application. For this reason valve problems may often be peculiar to one type of operation and only through experience and test can the optimum design and material be determined.

MACHINERY INDUSTRIES

(*Continued from page* 80)

Safety Award to Drop Forgers

An award, presented by the National Safety Council to trade associations with the most outstanding safety programs, was given to the Drop Forging Association. It was accepted by Frank Fiske, Brewer-Titchener Corp., Cortland, N. Y., who is chairman of the Association's safety committee. The award gives recognition to the Association for the general excellence of their safety services and their contribution to the reduction of occupational injuries in the drop forging industry.

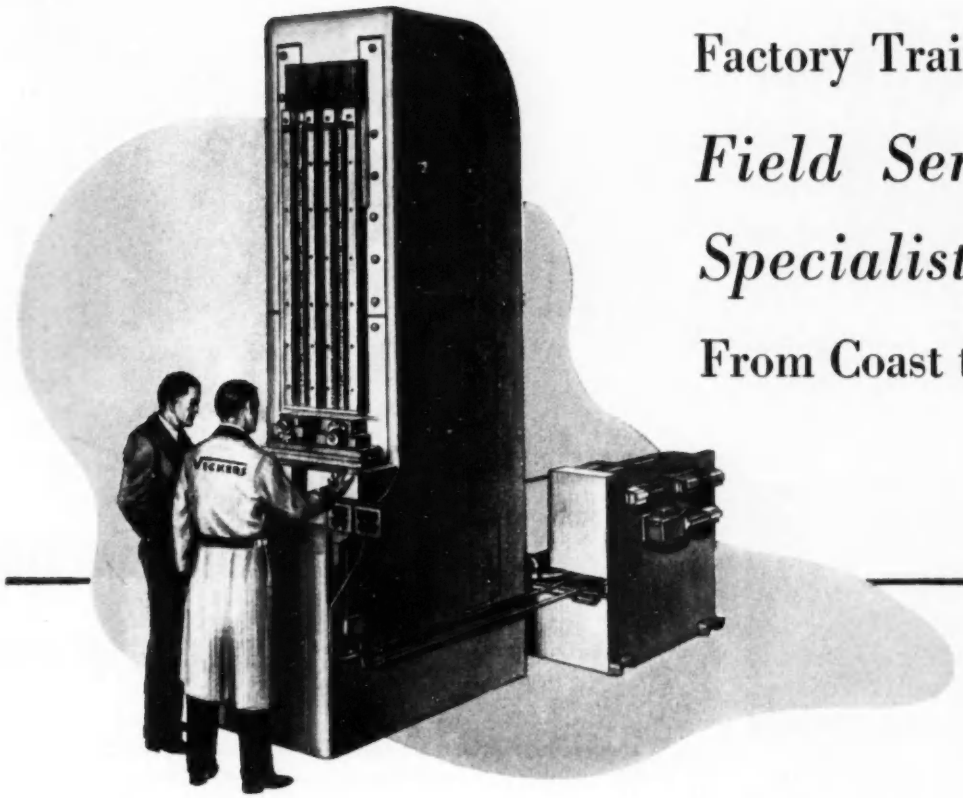
Around the Industry

Cincinnati Milling Machine Company's Hydroform process was the principal feature of the first Fall meeting of the Pressed Metal Institute. The meeting included a visit to

(*Turn to page* 114, *please*)

ONE OF A SERIES

You Get Many Benefits by Specifying VICKERS® Hydraulics



Factory Trained *Field Service Specialists* From Coast to Coast

All machinery made by man requires servicing at times. Every manufacturer has two responsibilities: First, to build his equipment in a way that will require the least amount of servicing. Second, to see to it that servicing, when needed, is handled with speed, efficiency and low cost.

Vickers hydraulic equipment is built to keep service requirements to an irreducible minimum. But when service is required, it is handled by Field Service Specialists working out of Vickers offices from coast to coast. These men have been carefully trained in Vickers plants and are thoroughly competent. They know how to adjust and maintain any piece of Vickers equipment . . . any combination of components. They are also qualified to instruct customers' service organizations in improving their hydraulic maintenance practices. These men devote their full time to servicing Vickers products in customers' plants. They do their job well and at minimum expense.

This is only one of many benefits you receive when you specify Vickers Hydraulics.

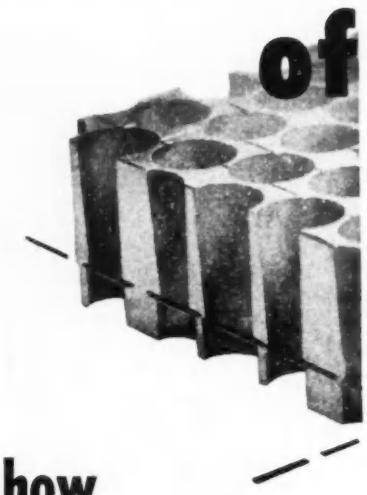
VICKERS
Incorporated
DIVISION OF THE SPERRY CORPORATION
1428 OAKMAN BLVD. • DETROIT 32, MICH.

Application Engineering Offices: ATLANTA • CHICAGO (Metropolitan) • CINCINNATI • CLEVELAND DETROIT • HOUSTON • LOS ANGELES (Metropolitan) NEW YORK (Metropolitan) • ODESSA • PHILADELPHIA (Metropolitan) • PITTSBURGH • ROCHESTER • ROCKFORD SEATTLE • TULSA • WASHINGTON • WORCESTER

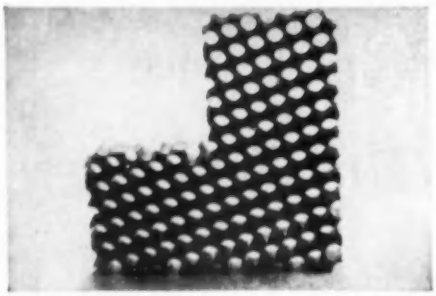
6395

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

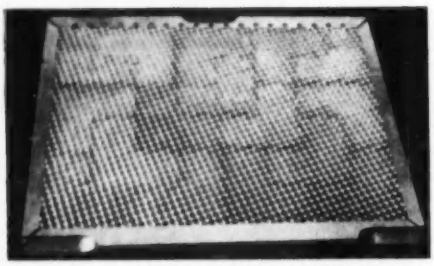
Here's a honey of



and here's how Doehler-Jarvis perfect this



This is the "L"-shaped die cast unit just as it comes from Doehler-Jarvis machines. It is 5" x 5" on the long sides, 2½" on the four short sides and is ¾" thick. Prior to Base assembly at the Blatchford plant, flash is removed from the edges, and top and bottom are shaved slightly. No other finishing is needed . . . thanks to Doehler-Jarvis die-casting methods.



Here is a complete Blatchford "Honeycomb" Base with inside chase dimensions of 15" x 20". (Unit assembly of these Bases makes possible sizes up to 50" x 75".) It is made up of 16 of the angle blocks held together only by the enormous pressure of the chase bars — bolted at the corners — that frame the base. Surface of the form must be absolutely flat without even a few thousandths buckle or warp. Holes must line up precisely. Doehler-Jarvis die castings make possible perfect fit and virtually invisible joints in assembly of Base units.

Stonehands position and anchor printing plates on the "Honeycomb" Base with special catches that fit and expand in the holes. The thin walls of the Doehler-Jarvis castings have to be strong and solid to withstand both the locking pressure and the gripping forces exerted by the catch. When the plate mounting is completed, the entire "locked-up" form goes to the printing press.

Before this intricate section was perfected, E. W. Blatchford Co. had to overcome some real production headaches.

To machine their lightweight "Honeycomb" plate mounting system for printers would have been prohibitively costly. They would have had to remove 71% of the metal volume in the component blocks. And no one could agree on a way to form the partial holes along the "block" edges without running up rejects and tool breakage.

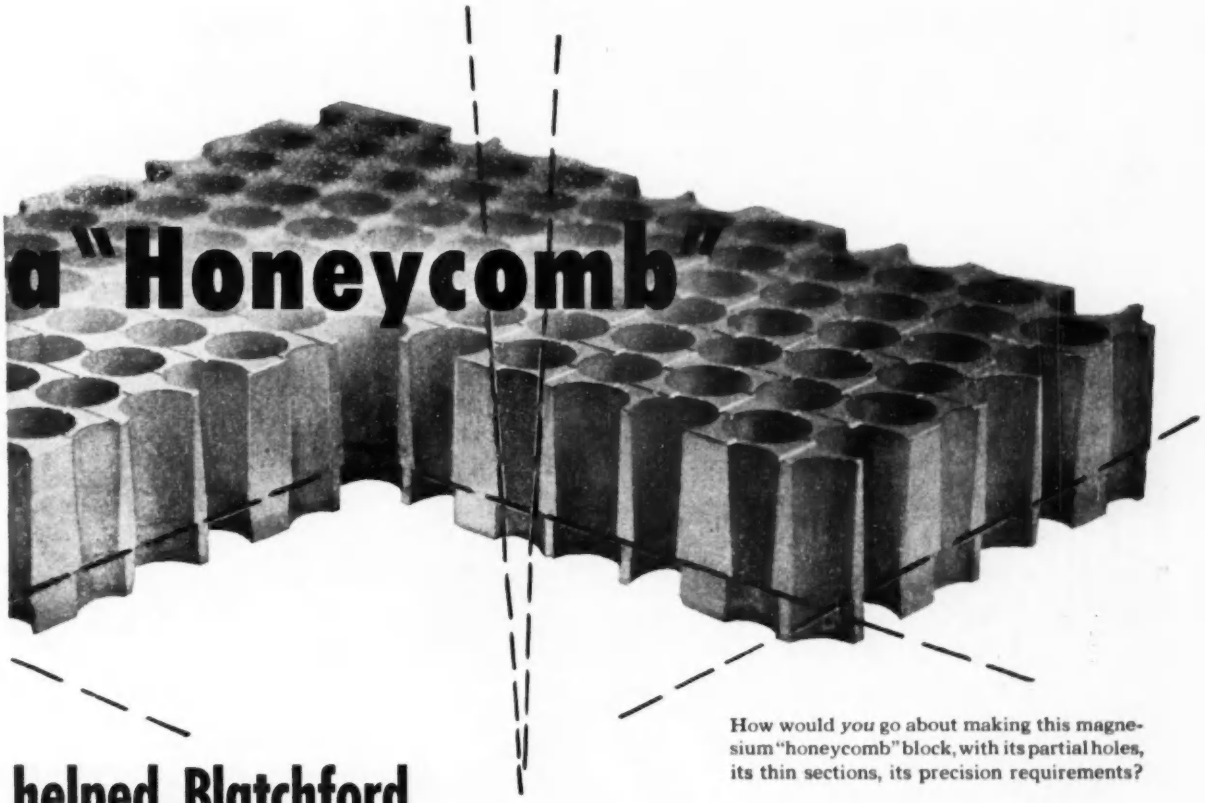
Then someone suggested die casting . . . a production technique that was just beginning to get wide attention 35 years ago. Die casting proved to be the practical answer but Blatchford engineers were still not completely satisfied. The behavior of the alloy was not always predictable and warpage of the "blocks" occasionally caused trouble.

Then Doehler-Jarvis entered the picture and worked the problem over with Blatchford people.

That did it. Quality went up and product performance improved. Over the years Doehler-Jarvis cast untold thousands of the "honeycomb" units. Printers bought Blatchford "Patent Base" like hotcakes . . . under Blatchford's 10-year guarantee.

Then, just a few years ago, Blatchford wanted to make the Base even lighter on men, even lighter on power, even lighter on presses. Again engineers from both companies joined forces. They put several light metal alloys to the toughest of tests.

a "Honeycomb"



How would *you* go about making this magnesium "honeycomb" block, with its partial holes, its thin sections, its precision requirements?

helped Blatchford complex component

A magnesium alloy finally was selected and Doehler-Jarvis designed and built a new production die.

Today, so precise is the Doehler-Jarvis casting technique, only 1/10 of an ounce – 1.82% of the as-cast weight – is removed in finishing the "Honeycomb" block. The new Magnesium Base weighs 72% less than the original Zinc Base. Needless to say, it too is winning its battle in the market place.

As one Blatchford executive puts it, "Doehler-Jarvis die castings helped get our Base over the hump in the first place, helped us stay competitive over the years, then helped us give the product a shot in the arm."

In its half-century of die-casting, Doehler-Jarvis has helped turn good ideas into metal for many producers, large and small – among them some of the best known makers of automotive, electrical, communication, household, office and other types of equipment.

When they come to Doehler-Jarvis, they know that Doehler-Jarvis can supply both the resources and the resourcefulness they need.

So next time you have a good new product idea... call Doehler-Jarvis in on the production engineering. We may be able to give you just the help you need.

Doehler-Jarvis Division
of
National Lead Company
General Offices: Toledo 1, Ohio

*Reg. U. S. Pat. Off.

Chevrolet Truck Engines

(*Continued from page* 51)

feature, available on light- and medium-duty models. It is four-speed Hydra-Matic design, except on the sedan delivery model, on which Powerglide is available.

Operation of the clutch is improved in all trucks by the new assemblies that use three equally-spaced, spring-steel straps to drive the pressure plate. Clutch facing is larger and more durable.

A new, heavy-duty three-speed transmission is optional for Series 3000 trucks. Wider gears, heavier mainshaft support bearings, larger double row roller countershaft bearings and gear ratios better suitable to truck operation are features. A four speed Synchro-Mesh transmission, standard on Series 3800 and 3900, optional on Series 3100, 3600 and 3700, provides lower gear reduction when extra pulling power is needed.

Dual 2½-in. tubular, Hotchkiss type propeller shafts with three universal joints are adopted on the Series 3600 and 3700 trucks. Larger shafts are used on the Series 5400, 5700 and 6000 trucks. New universal joints have greater capacity and are of simplified construction.

Rear axles are improved for heavy-duty operation. A new gear ratio of 3.9 to 1 is used on the 3100 series, and the axles are more rugged on the Series 5000 and 6000. The rear axle on heavy-duty models has a capacity of 13,000 lb.

The regular three-speed Synchro-Mesh transmission for Series 3100, 3600 and 3700 is greatly improved to provide increased durability and greater capacity. Gears are carburized for increased resistance to wear. Gear teeth are chamfered to allow greater tooth contact, and are shot peened to resist metal fatigue.

In addition to the regular production options described above, these items also are available on certain models at extra cost: heavy-duty clutch, positive crankcase ventilation, a governor, oil filter, a choice of three generators of higher output, combination fuel and vacuum pump, oil-bath air cleaner, heavy-duty cooling system, Hydrovac power brake, right hand seat for panel and canopy express models, dual electric windshield wipers, direct double-acting shock absorbers, auxiliary rear springs, side-mounted tire carrier, two-speed rear axle and a rear bumper of new design.

A de luxe cab, available on all models, has rear corner windows, bright metal reveal moldings around windshield and windows, dual horns, right hand sunshade, driver arm rest, cigarette lighter, harmonizing maroon and gray trim.

Manufacturers of...

HARDENED and GROUND PARTS

for over 40 years

SINCE the day of the duster and goggles, The Brown Corp. has meant highest quality precision parts for the automotive industry. Today, Brown Parts serve trucks, tractors, trailers, buses, axle builders, off-the-road machines and Diesel locomotives. The production methods and facilities we have developed are unexcelled — uniform product quality is assured—deliveries are reliable—service is efficient. Ask any of our long list of satisfied customers throughout the industry.

For further information about our specialized production of hardened and ground automotive and industrial parts, just drop us a note. We invite an opportunity to quote on your work.

Henry W. Brown

PRESIDENT

KING PIN

Parts include . . .
King Pins
Shackle Bolts
Shackle Pins
Brake Anchor Bolts
Countershafts
Idler Shafts
Stub Axle Shafts
Steering Ball Bolts
Beam Balls and Bolts
5th-Wheel Rocker Shafts
Wheel Studs
Water Pump Shafts
. . . anything in the hardened and ground line, of any analysis steel, up to 4¼" diameter.

THE BROWN CORP.

213 BELLEVUE AVE. SYRACUSE, N. Y.

C. H. Ehlert, 3407 Clarendon Rd., Cleveland • N. F. Spring, 4716 Balfour Rd., Detroit • R. C. Sanderson, 5609 N. Clark St., Chicago • Harry J. Windmiller, 1704 Carlton, Fort Worth • Johns William & Co., 1440 N. Spring St., Los Angeles, Calif. • John B. Hunt, 5611 S.E. Yamhill St., Portland, Ore.

MACHINERY INDUSTRIES

(*Continued from page* 110)

the Roland Teiner Co., Everett, Mass., where the Hydroform was demonstrated.

Incidentally, Cincinnati Mill is reported to be the first firm in the U. S. to start construction of underground bomb shelters. The shelters are being built under a Government plan for atomic bomb protection for key industries. A 100 per cent tax write-off is allowed on construction costs.

Gear Index

Gear volume for September showed an 11.6 per cent increase over August. Based on 1947-49, the latest index figure is computed to be 135.6.

WANT TO REDUCE COSTS PER PIECE?

FROSTRODE removes excess heat from the coolant!

Frostrode Coolant Coolers Will Give You—

- LONGER TOOL LIFE WITH LESS MAINTENANCE
- IMPROVED SURFACE FINISH
- INCREASED RATE OF PRODUCTION
- REDUCTION OF REJECTS

Users of Frostrode Coolant Coolers have recorded amazing increases in efficiency.

"If you can pump it FROSTRODE can cool it"

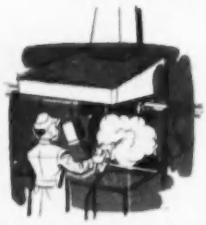
Write for examples of FROSTRODE installations applied to machine tools—BULLETIN 502

FROSTRODE® DIVISION OF VIKING PRODUCTS

3066 EAST OUTER DRIVE • DETROIT 34, MICHIGAN

WANT TO LOWER YOUR PAINTING COSTS?

...and get a better paint job, too? Check the RANSBURG Processes!

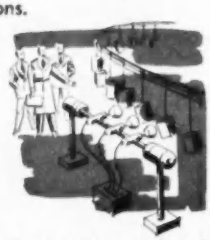


Let's say you're a manufacturer of some painted product. Size and shape aren't too important. You're already using a conveyorized set-up, but you want a better quality finish . . . increased production . . . at less cost.

You've heard about electrostatic spray and some of the phenomenal results being achieved by Ransburg on other production lines. You write or call . . . say you want to know what Electro-Spray painting can do for YOU.

Ransburg engineers will help you investigate the possibilities. They'll gather complete data on your present operation, and check your facilities and requirements. If Electro-Spray is feasible, you will send samples of your unpainted products—with paint—to the Ransburg laboratories in Indianapolis. The labs are completely equipped, and the Ransburg engineers and technicians have every facility at their disposal for conducting extensive tests, simulating your production conditions.

After the priliminary studies and tests, you are invited to see your job run in the Ransburg Labs. There's no guesswork. You'll see the actual results. Paint and labor savings are determined. You can check the improved, uniform quality, and you'll be furnished drawings, showing the proposed installation for your own plant.



ALL OF THIS WITHOUT OBLIGATION TO YOU!

After the Electro-Spray equipment is installed, Ransburg will continue to work with your finishing department. Ransburg engineers—men skilled in electrostatic spray painting—are always available to work with you on any problem which might arise in your finishing department. Fair enough? Let us hear from you.

RANSBURG

Ransburg **ELECTRO-COATING CORP.**

INDIANAPOLIS 7, INDIANA

SHORTIES

The average motorist uses about 700 gal of gasoline yearly. In 1918, by distillation only, it would have taken about 66 barrels of crude oil to supply this amount of gasoline. Today, by distillation plus cracking, only 39 barrels are required.

•

Since the first turbojet plane was flown in this country 10 years ago, America's aircraft industry has delivered 10,000 jet airplanes and 40,000 jet engines to the Air Force.

•

Assuming that the average automobile engine is cranked eight times daily, American motorists have been provided with 934.4 billion starts in the past 41 years by one manufacturer of electric starting motors.

•

More than 1000 research projects to increase aviation safety, costing more than $55 million annually, are underway in this country.

•

The heat that is generated when stopping a 4500-lb car going only 20 mph, if applied continually at the same rate, could warm a 14-room house in zero weather.

•

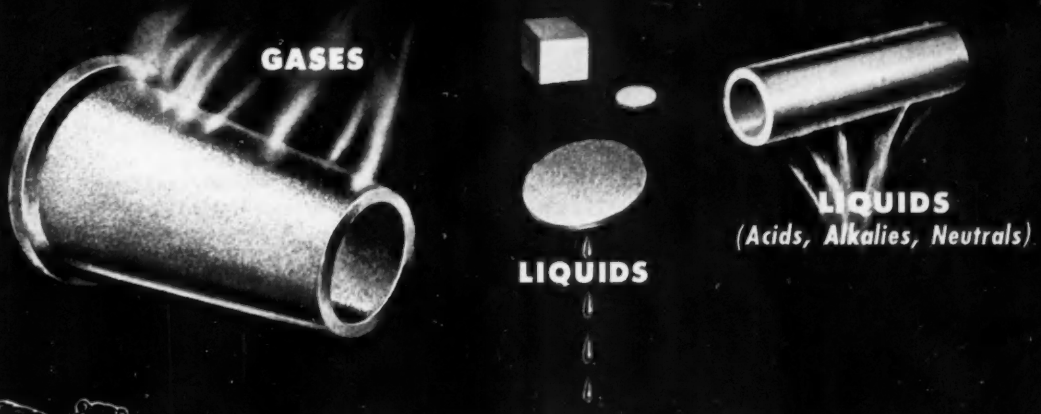
The estimated 2800 helicopters thus far produced in the U. S. have flown some 1.2 million hours —equal to about 137 years of flying by a machine that first went into commercial production only seven years ago.

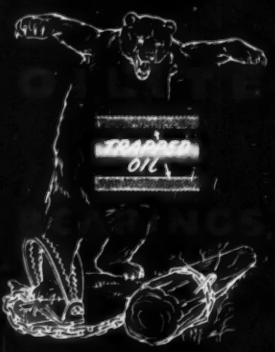
•

For each $100 of sales in 1952, aircraft manufacturers earned an average of $2.40, compared with an average of $5.40 earned by all manufacturing industries.

OILITE
Permanent METAL FILTERS

Oilite PERMANENT FILTERS Provide:





CHRYSLER CORPORATION
Amplex Division, Dept. J
DETROIT 31, MICHIGAN

FIELD ENGINEERS, DEPOTS AND DEALERS THROUGHOUT UNITED STATES AND CANADA

Oilite Products Include: Bearings, Finished Machine Parts, Cored and Solid Bars, Permanent Filters and Special Units 6433

Aircraft Hydraulic Problems

(*Continued from page* 67)

tubing; hose; general questions. The list of subjects certainly is all-inclusive and impressive in a coverage of hydraulic problems.

Some ideas of general interest were developed during the discussion. For one thing there was a general interest in the use of liquid moly-sulfide as a lubricant for pumps; a wide use of Magnaflux and Zyglo inspection procedures even for small component parts as a part of preventive maintenance procedures; the use of chromium plating as salvage procedure; development of special service tools not only by Vickers but by individual operators. While no mention was made of metallizing, this might well be a topic for further investigation as a normal salvaging procedure, since some operators are employing brazing.

Aetna Ball & Roller Bearing Co., invited to discuss service problems with pure thrust bearings, presented a report showing progress on a research project dealing with occasional examples of gyration scratches in ball races, leading to surface fatigue failures.

Out of the many hours of detailed discussion there emerged the important fact that the exchange of information at the conferences is already paying dividends. Numerous instances were cited where certain components either are giving longer life already or improvements are in the works that will guarantee longer life and freedom from occasional failures. Noteworthy too was the conclusion of many operators that dependability was more important than further increases in the life expectancy of accessories and parts. It was noted that Vickers and other manufacturers are approaching the problem of dependability by further tightening of controls in materials, metallurgical techniques, and statistical quality control.

It was evident that operators are experiencing considerable difficulty with life and reliability of bladders and diaphragms in accumulator systems. The conclusion was that this subject requires further study, leading to still further investigation of synthetic rubber compounds and improved methods of batch control in the interest of reliability. Considerable discussion took place as to the shelf life of rubber parts such as bladders and diaphragms. It was found that ideas concerning shelf life varied considerably, from six months in some instances to as much as two and four years. The producers, such as Vickers, recommend shelf life of four years, providing the parts are properly stored under controlled conditions. In all cases, it was agreed that such parts are to be inspected 100 per cent before issuance to the repair shops, and should be further subjected to inspection at overhaul as well as routine inspection periods.

Some attention too was accorded to the principle of packaging rubber parts individually or in small multiples in hermetically sealed packages to protect them during storage.

Some time ago Douglas gave operators of DC-6B ships the option of installing a second — auxiliary — hydraulic accumulator when ordering new equipment. It developed that a second accumulator no longer is necessary and Douglas recommends use of a single system from now on.

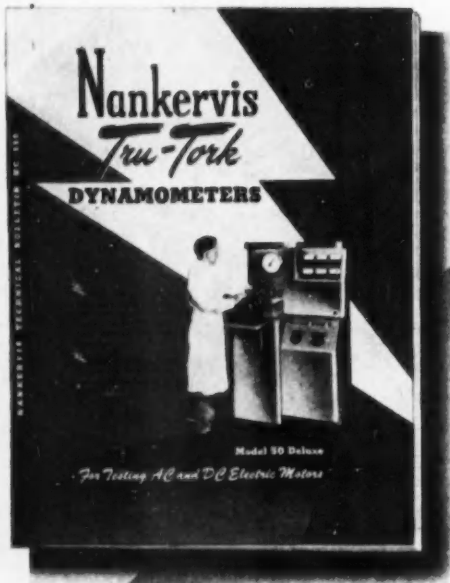
The subject of safety type hydraulic

(*Turn to page* 122, *please*)

Testing

AC or DC electric motors?

. . . then write now for this new illustrated 4-page folder on Nankervis Tru-Tork dynamometers. It's hot off the press!



The Nankervis Tru-Tork dynamometer is the only absorption dynamometer with a self-regulating brake. It assures constant torque regardless of speed variations of the motor under test . . . and reads directly in foot pounds and in horsepower without conversions or formulas.

Be sure to write . . . for bulletin No. 552 . . . today! No obligation of course.

GEORGE L. NANKERVIS COMPANY
INDUSTRIAL TESTING DEVICES
19255 W. Davison Avenue Detroit 23, Michigan

another reason why owners say —

"We use the VERS-O-TOOL SYSTEM"

They call it a "system" because, among other exclusive features, Vers-o-tools are provided with a patented Namco Micrometer that takes the guess-work out of chaser grinding.

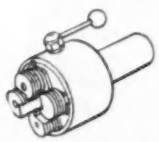
No trial cuts, no adjustments, no time or scrap loss. And by providing an extra set of chasers, kept ground in the toolroom and ready, you put long run jobs on a continuous production basis. Time saved by using this gage frequently adds thousands of precision threads—reduces your costs.

Other Advantages of the System

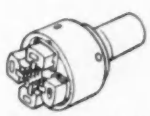
Standard Vers-o-tools use either the famous ground thread circular chasers or the lower cost, adjustable-blade, ground thread chasers—interchangeable die size for die size, in both revolving and non-revolving self-opening heads. The same system applies for end forming and end turning cutters. Use of knurls and rolls is common practice.

Once you start using Vers-o-tools, you are immediately equipped for a more versatile use of threading equipment, at a lower tool investment, than is possible from any other source.

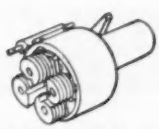
Ask for DT-52, complete new catalog on Vers-o-tool and Namco Solid and Collapsible Taps.



Style DS Vers-o-tool (Non-revolving Type) 10 Sizes, ⅜"—6½".



Style DR Vers-o-tool (Revolving Type) 13 Sizes ⅛"—6½" Shown with Adjustable Blade Chasers 7 Sizes, ⅜"—2".



Style DBS Vers-o-tool (for B&S Automatics) 3 Sizes, ¼"—⅝".

Patented NAMCO MICROMETER takes the guess-work out of chaser grinding

THIS IS THE WAY IT WORKS:

- ★ Remove chasers from Vers-o-tool head (in one minute) and take a micrometer reading.
- ★ Regrind them to the same micrometer reading. (Perfect control of the grind is automatic through serrated mounting of circular chasers—rechecking on the gage proves their uniformity.)
- ★ Replace chasers in head (one minute) with certainty that they will cut threads *identical* to those cut on previous grinds.

24-HOUR DELIVERIES ON MOST STANDARD STOCKABLE NC AND NF CHASERS AND BLOCKS — ALSO NATIONAL TAPER PIPE AND DRY SEAL

The NATIONAL ACME CO.

170 EAST 131 STREET, CLEVELAND 8, OHIO.

Acme-Gridley Bar and Chucking Automatics, 1-4-6 and 8-Spindle — Hydraulic Thread Rolling Machines — Automatic Threading Dies and Taps — Limit, Motor Starter and Control Station Switches — Solenoids — Contract Manufacturing

cold forged

Precision Cap Screws

● Wherever shear, stress or vibration is encountered, **CHANDLER** cold forged metal fasteners assure perfect performance. Uniformly accurate, they speed assembly operations.

The quality and precision of **CHANDLER** cap screws can be measured by their wide use in major industries. **CHANDLER** fasteners are used by leading manufacturers of gasoline, jet and diesel engines designed for automobiles, aircraft and heavy equipment.

Whatever your requirements, specify **CHANDLER** precision cold forged cap screws.

- Grinding to Close Tolerances
- Drilled Heads or Shanks

1304-CH

Specialists in Thread-Rolling After Heat Treating

CHANDLER PRODUCTS CORPORATION

1492 Chardon Road, Cleveland 17, Ohio

ON OUR WASHINGTON WIRE

Congress is becoming less concerned about possible pressure from states for removal of the Government from the gasoline tax field. Most states want the Government to withdraw but cannot get together for a concerted drive.

Commerce Dept. reports that personal income rate remained steady at $287 billion during the third quarter, about $2 billion higher than the second quarter. Outlays for automobiles were off somewhat, but consumer credit, sparked by automobile paper, increased $2 billion since Jan. 1 to a total of $21.1 billion.

Carbon steel ingots and bars, billets, blooms, all grades of pig iron, and numerous other iron and steel products may now be shipped to most countries without an individual export license. The new ruling was made recently by the Bureau of Foreign Commerce.

There is opinion in some quarters that the Administration's forthcoming budget recommendations will include substantial increases in Air Force funds. The added appropriations may offset the five billion dollars trimmed this year from requested appropriations.

Military-backed research activities will require spending of about $1.3 billion in this fiscal year. This is a sizeable outlay, but it represents only about three per cent of the 42 billion Defense Dept. will pay out before next July 1.

Classified Advertisement

FURNITURE MFR. SEEKING NEW DESIGNS FOR CHAIR MECHANISM. If you have perfected something different in a mechanism you think can be incorporated into a quality made upholstered chair, we would be glad to hear from you. Send preliminary details to: Box 73, AUTOMOTIVE INDUSTRIES, 5601 Chestnut St., Phila. 39, Pa.

AVAILABLE FROM STOCK FOR **IMMEDIATE DELIVERY**

acrylic

rods and tubes

CLEAR CRYSTAL METHYL METHACRYLATE

Rods and tubes for industrial novelty display, models and all other fields.

Write for price lists and samples today

ACE PLASTIC COMPANY

Precision Extruders and Fabricators

91-46 Van Wyck Expressway • Jamaica 35, N. Y.

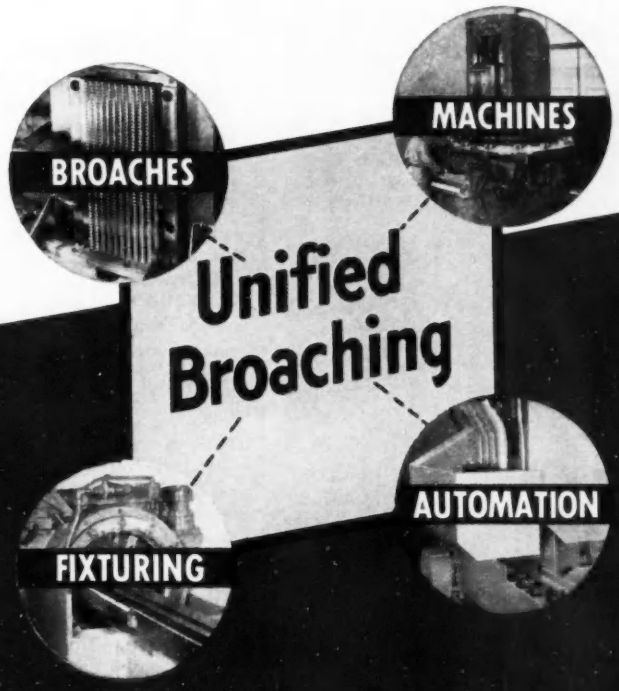
SIZES AVAILABLE

RODS

1/8"
3/16"
1/4"
5/16"
3/8"
7/16"
1/2"
9/16"
5/8"
11/16"
3/4"
7/8"
1"
1 1/8"

TUBES 1/16" wall

1/4" O.D.
3/8" "
1/2" "
5/8" "
3/4" "
7/8" "
1" "

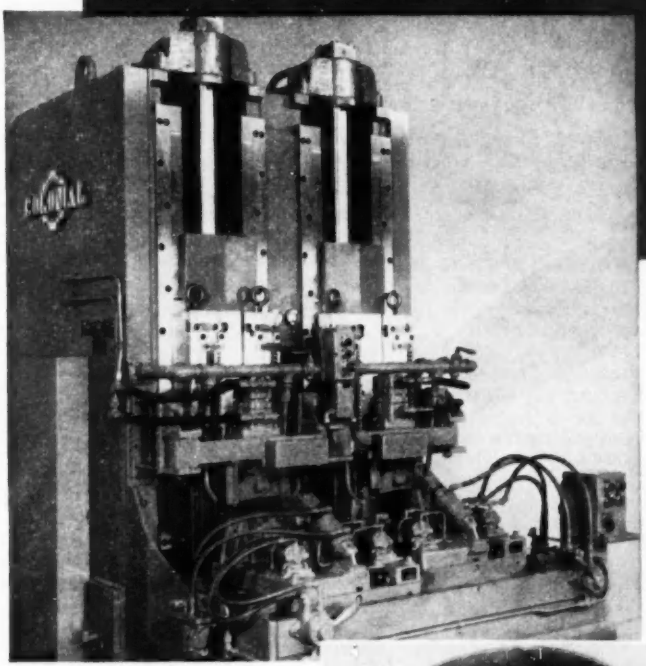


the COLONIAL method

At Colonial, experience, imagination and competence are applied

1 to the design and manufacture of each of the individual components of a complete broaching installation, and

2 to the effective combining of ALL components into a completely UNIFIED BROACHING installation—making them work as a "team."



400 Brake Shoes Broached per Hour

Here a 1/2-inch slot and a 13/32-inch concave are broached at opposite ends of 400 brake shoes per hour. Stock removed is 3/32-inch.

Colonial provided instantaneous pneumatic positioning; automatic hydraulic clamping; two shuttle fixtures; uniform taper insert broaches—all unified on a Colonial dual ram with 54-inch stroke.

WHAT'S AHEAD IN BROACHING?

Keep up with the latest developments: Read "Broaching News". We will be glad to see you get it regularly if you will drop us a line on your company letterhead.

PIONEERS OF H.S.S. BROACHING

COLONIAL BROACH CO. DETROIT 13

Tuesday, October 21, 1952 THE MIAMI HERALD 21-A

Financial News

Winn & Lovett's Earnings On Rise

By United Press

JACKSONVILLE—Winn & Lovett Grocery Co. reported for the quarter ended Sept. 20 sharply higher earnings, reflecting economies achieved through mechanization in warehousing and merchandise handling.

Net for the first quarter of the current fiscal year, totaled $600,597, or 44 cents a share on common, compared with $409,342 or 29 cents in the same quarter last year. Net sales of $41,851,672 compared with $36,763,499.

As of Sept. 20 the food chain had in operation 181 retail outlets [illegible] in Florida.

How To Make More Money

THIS NEWS CLIPPING suggests one way to make more money. Winn & Lovett's "sharply higher earnings" prove that a dollar saved is *still* a dollar earned.

"Mechanization" saved more than 50% of Winn & Lovett's handling bill. "Mechanization" in this case means a fleet of CLARK fork trucks and towing tractors, operated on a well-planned schedule. These savings, together with increased retail volume and retail operating improvements, resulted in "sharply higher earnings," and the company made financial headlines.

The moral of this story is this:

Call in your local CLARK dealer to discuss ways to cut handling costs. That's what Winn & Lovett did, and look what happened!

CLARK ELECTRIC, GAS, DIESEL, L.P. GAS FORK TRUCKS
AND POWERED HAND TRUCKS · INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION · CLARK EQUIPMENT COMPANY · BATTLE CREEK 68, MICHIGAN

Please send: ☐ Condensed Catalog ☐ Have representative call
☐ Driver Training Movie

Name_____

Firm Name_____

Street_____

City_____ Zone_____ State_____

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

Aircraft Hydraulic Problems

(*Continued from page* 118)

fluids naturally held the center of the stage. Monsanto's Skydrol; Hydrol; and Hollingshead H-2 fluids came in for discussion, the latter fluid being still in its experimental stages. It is interesting that a change in fluid type brings with it associated problems of sealing as well as other questions. For example, it was brought out that Skydrol must be handled carefully and should be specifically confined within the areas in which it is used, if best results are to be expected. Too, Skydrol requires a special type of paint on the plane itself if the finish is to remain unimpaired. Currently, two companies are producing a special type of paint to be used with Skydrol.

OBSERVATIONS

(*Continued from page* 96)

planned, would have seating capacity for 50,000 people, and would contain 490,000 sq ft of floor space completely clear of columns or obstructions. This year the Illinois legislature appropriated $5.7 million for a Chicago convention hall to start the ball rolling. The significance of this news story is that if it were possible to complete the structure by 1955—which is problematic—it could well provide the facilities necessary to house the national machine tool show now under discussion in NMTBA circles.

Hydra-Matic Production

Everyone knows now that GM succeeded in passing a miracle in getting Hydra-Matic production under way. They delivered as promised to Lincoln to start the bank for 1954 production. In making the goal ahead of even optimistic estimates GM was helped mightly by its friends in the machine tool industry. We recently addressed the Gisholt Management Club in Madison, Wis., and learned that Gisholt turned things up-side-down to deliver its commitment of rebuilt machines as well as new machines at least three weeks ahead of the time table. They are mighty proud of this record—and should be—since they also kept their delivery promises to other customers on the books.

Take a closer look at your

SURFACE FINISHING PROBLEMS

B&W Mechanical Tubing can be supplied in these various surface finishes:
COLD FINISHED
Roto-Rocked—smooth surfaces obtained by special sizing and finishing processes.
HOT FINISHED
bears the scale formed during hot fabrication or heat treatment.
COLD FINISHED
Cold Drawn—smooth scale free surface.
TURNED
machined, uniform OD.
POLISHED
OD and/or ID polished in various degrees of smoothness.
FLASH IN OR REMOVED
Electric-resistance-welded tubing with or without bead formed during welding.
PICKLED
de-scaled by one of several solutions.
B&W
SEAMLESS and WELDED
TUBES

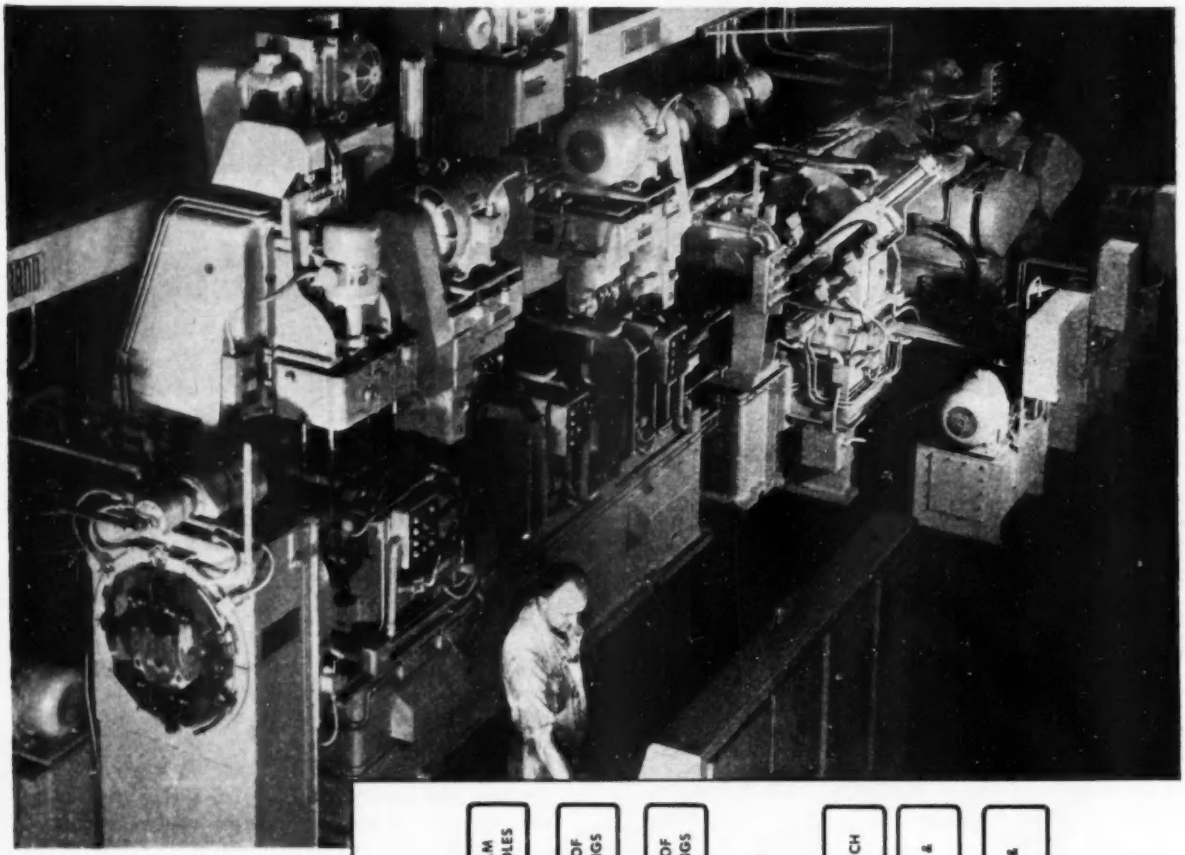
In selecting steel tubing for use in manufacturing your product, the type and grade of tubing you choose will make your surface finishing operations easier, or more difficult . . . will facilitate or complicate your other production steps as well. To realize maximum savings in time and cost of your own finishing operations, *start* with tubing having the proper surface finish when you receive it. And as finishing is probably the last in your series of production steps, choose tubing with the surface finish best keyed to *all* your production steps.

Whatever your surface finishing operation may be—machining, painting, polishing, plating, or any variation of these—it will pay you to consult Mr. Tubes, your nearby B&W Tubing Representative. He can help you match B&W tubing types to your plant facilities and specific jobs . . . to speed production, reduce costs, and turn out a better *finished* product—surface and otherwise. And he's as close as the phone at your elbow. Write for bulletin TB-350 "Putting a Finish on Parts and Products Made from B&W Mechanical Tubing."

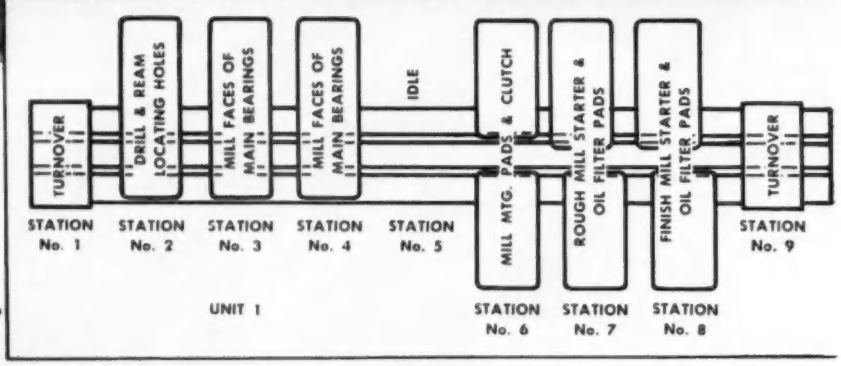
THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

TA-1752(M)

Another Example of SUNDSTRAND



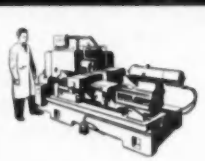
12 Station Process Line for Cylinder Blocks

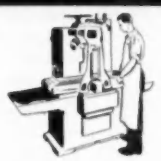


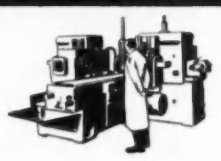
Whether processing several parts over one machine or one part through several machine elements, as shown above, Sundstrand "Engineered Production" results in the most economical method of machining to meet the job at hand. It consists of determining the most profitable and productive processing method first, then, providing the machines to suit this method — standard or semi-standard

SUNDSTRAND "Engineered Production" Service* *REG. U.S. PAT. OFF.

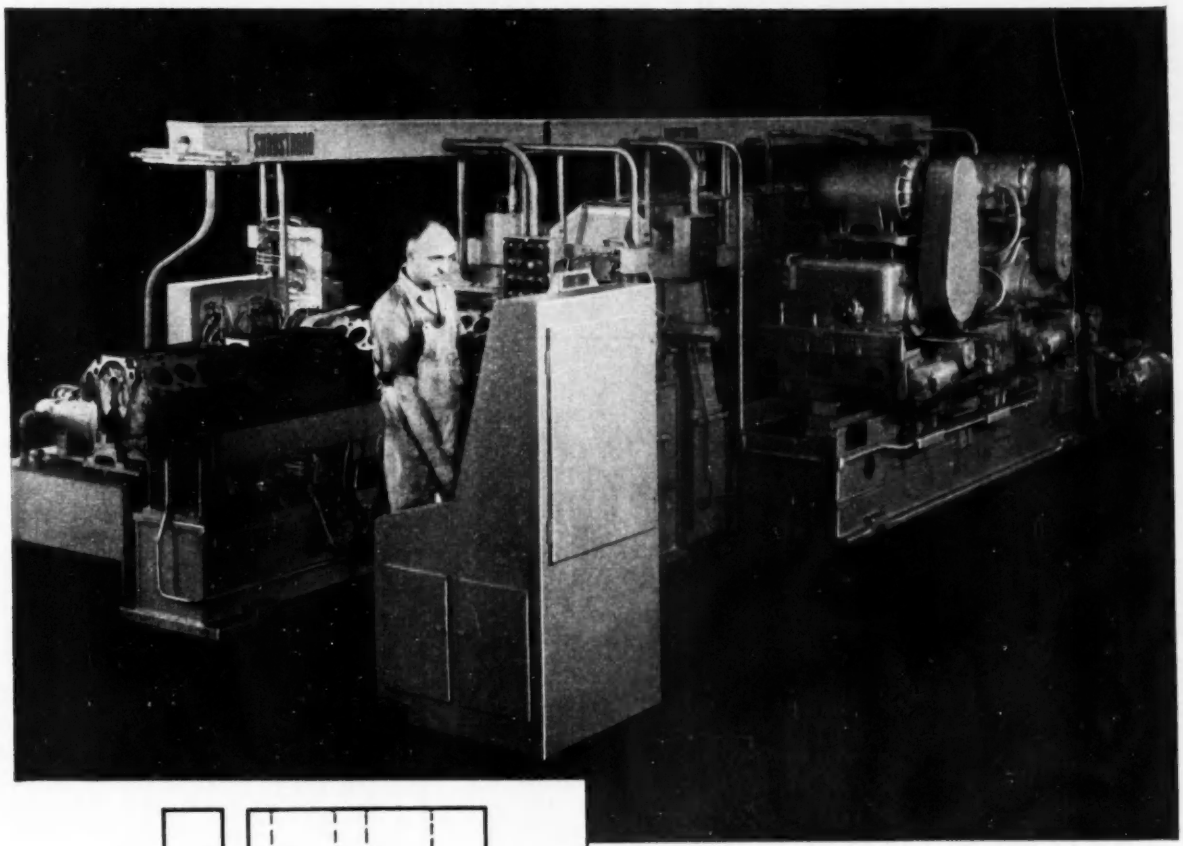
AUTOMATIC LATHES | SIMPLEX RIGIDMILS | DUPLEX RIGIDMILS

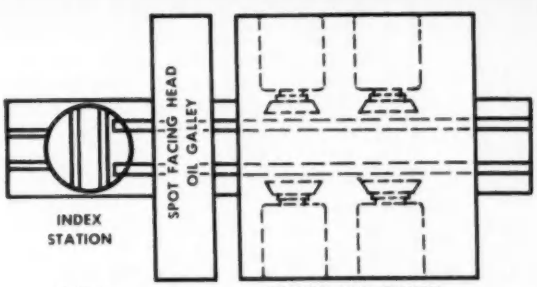






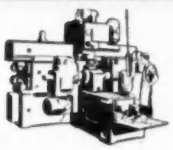
"ENGINEERED PRODUCTION"

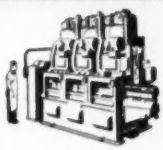




machines, if possible, or entirely special machines, if necessary. This special Sundstrand 12 station transfer type machine is a good example of the results of Sundstrand "Engineered Production" Service. The drawings and photos show the two units which are joined together in the production line. Cylinder blocks are automatically handled from incoming to outgoing end of machine for operations as indicated on drawing. Production rate is approximately 80 pieces per hour. If you have metal working operations in your plant, call in a Sundstrand Process Engineer. There is no obligation for this service.

TRIPLEX RIGIDMILS | SPECIAL MACHINES





SUNDSTRAND
Machine Tool Co.
2571 Eleventh St. • Rockford, Ill., U.S.A.

Sports Models at London Show

(*Continued from page 65*)

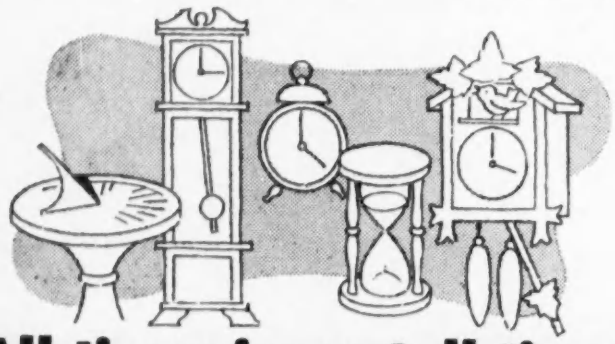
Group the Hillman Minx was shown as a slightly modified Mark VII model with a larger trunk, new rear fender lines, a separate well for the spare wheel and minor mechanical alterations. The Humber range is not altered at present.

In view of the new small Eight shown for the first time at Paris the larger Standard Vanguard has come in for less attention. The Standard Eight is notable for a roomy interior with the short wheelbase of only 84 in. Power output of the 800 cc (48.8 cu in.) ohv engine is slightly lower (26 bhp at 4500 rpm) than that of comparable engines, but good overall performance has nevertheless been attained. In the Triumph range, a subsidiary make to the Standard, the small Mayflower two-door sedan with knife-edge body has been abandoned, but the Vanguard-engined Triumph Renown is still being built with this style.

A feature of the British automobile industry is the relatively large number of makes and models still being built. Production figures of the aforementioned five groups of firms tend to overshadow the importance of the smaller concerns, producing what is commonly called the specialist car. Of these only two, namely Rover and Jaguar, have so far been able to reach and maintain sufficient production numbers for self-supporting vehicle manufacture. The Rover 75 model is supplemented by a two-liter four cylinder 60 and a larger-engined six cylinder 2.638 cc (160.92 cu in.) 90, both using the same chassis and body. The well known engine design with overhead inlet and side exhaust valves used in conjunction with an inclined cylinder head is common to all three engines, and relatively high power output—corresponding to model designations—is attained

No changes are made to the Jaguar range consisting of the Mark VII Sedan, available in U. S. A., with the Borg-Warner automatic transmission, and the various XK 120 sports models.

Although the big Daimler straight-8 was again shown, the Daimler-Lanchester range comes in for simplification and higher output. This is now almost solely restricted to an average-sized chassis, being called the Lanchester Leda if fitted with a two-liter four cylinder engine or the Daimler Conquest when a new 2½ liter Six with 75 or 92 bhp is fitted. An intermediate version, the Lanchester Dauphin, is equipped with the Daimler engine and a special coupe body by Hooper. The automatic transmission used in the Rolls Royce and Bentley range, which is built under General Motors license, is in reality the Hydra-Matic Dual Range and is now available on the British home market, having formerly been restricted to export only. The Alvis three liter, six cylinder model can now be obtained with an engine developing 100 to 110 bhp. The Armstrong-Siddeley Sapphire, which had been introduced as a 3½-liter model with a square engine 12 months ago, is available with two carburetors and an output increased from 120 to 150 bhp. The former 2½ liter engine of the Lagonda, hitherto the only British car with independent rear suspension, has been replaced by a similar twin ohc unit of three liter and 140 bhp. These modifications show that a kind



All timepieces tell time!

Time is an important element especially when it involves cleaning, stripping, coating or other pre-finish operations. Time is important as an element in quality and in cost.

Difficulty in attaining the result you seek may be a matter of timing only. Klem Engineers will not only specify the proper chemical for your job, but steer you in proper application, timing, temperatures, concentrations, etc. The extensive experience of this organization and lab facilities for exactly duplicating your conditions make possible more accurate analysis and recommendations.

3 OF 20 STANDARD KLEM PRODUCTS

MINIT KOTE—Cleans, neutralizes, phosphatizes ferrous metals and aluminum surfaces in 60 seconds for better paint adhesion.

BRITE KOTE No. 80—Protective dip before storage of copper and brass, removes all oxides and stains—an excellent protection from further corrosion

KLEM KLEANER No. 167-PG—Still or soak tank cleaner for non-ferrous metals. Economical, efficient—will safely remove normal types of soil.

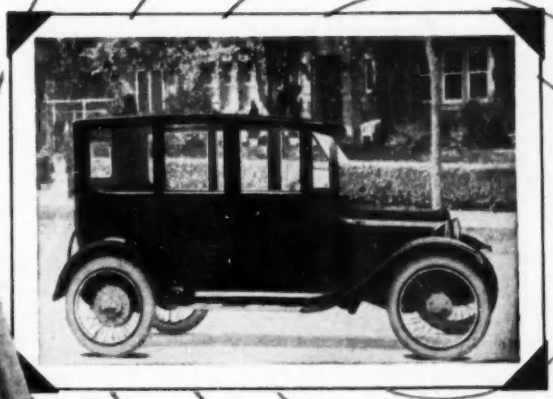
KLEM PRODUCT of the MONTH

KLEM KOTE

Cleans and conditions iron, steel and aluminum surfaces, imparts a fine phosphate coating on metal surfaces for better paint adhesion. KLEM KOTE is non-toxic, non-inflammable, requires no special handling precautions Write for details.

KLEM Chemicals Inc.
14491 LANSON . . . DEARBORN, MICHIGAN

another case where welded steel tubing does the job best . . .



HOW we took the rumble out of grandpa's sedan . . .

● Remember the rumble and roar that began when the old-style drive shaft under the floor started vibrating and whipping at 40 MPH.?

Today's automobiles can travel at twice Grandpa's speed with never a whisper of whip and rumble from the propeller shaft. Many such shafts are Republic ELECTRUNITE Tubing...uniformly round, fully concentric, with uniform wall thickness all around the tube and from end-to-end. There can be no heavy spots or light spots to throw the rotating tube out of balance.

Another advantage . . . Republic ELECTRUNITE Tubing has plenty of strength to withstand the reversal of torque when you release the accelerator and change from engine-driving to engine-braking conditions. The uniform walls of the light-and-strong hollow steel tube can "take" this twist for hundreds of thousands of miles.

This propeller shaft should give you the idea that welded steel tubing made the Republic ELECTRUNITE Way can take a lot of punishment . . . and come back for more. We'd like to tell you *all* the things that Republic ELECTRUNITE Tubing is doing successfully, and at lower cost. Write to:

STEEL AND TUBES DIVISION
REPUBLIC STEEL CORPORATION
252 East 131st Street • Cleveland 8, Ohio

Write for this booklet of design data and ideas on Republic ELECTRUNITE *Mechanical Tubing. Ask for "Booklet STMT 100."*

REPUBLIC STEEL

Republic
ELECTRUNITE TUBING

Why wait? New, extra durable

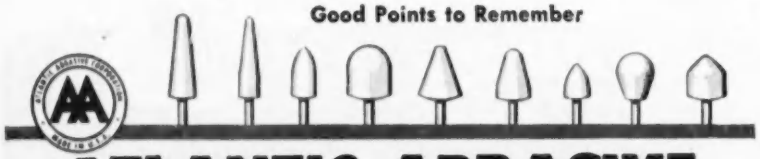
NU-TEX
MOUNTED POINTS
can speed up production ...cut your finishing costs *now!*

Here's why. *First* — new, longer lasting NU-TEX Mounted Points have been specially designed to grind, polish and deburr all types of metals and plastics *in one simple operation.* Unlike other mounted wheels, they have a soft, cushion-like action that produces even, extremely smooth finished surfaces quickly and easily . . . eliminates the need for filing, scraping, sanding or burnishing . . . makes them ideal for touch up work on dies and molds as well as for polishing and deburring all types of automotive and aircraft engine parts.

Second, because NU-TEX Mounted Points are bonded together with a special resin under an exclusive manufacturing process, they last longer under continuous operation . . . lower replacement costs . . . provide a better polishing and deburring action than any other product of their kind. Comparison tests conducted in the Standards Department of a leading automobile manufacturer, prove that NU-TEX Points cut cleaner and smoother . . . eliminate clogging or loading, even on softer metals.

Third, by specifying NU-TEX Mounted Points, you eliminate costly shipping delays . . . choose from a complete line of wheel shapes . . . get prompt service on every order. Try them and see. *Don't* wait — send for descriptive folder now or, better yet, have our representative show you NU-TEX Mounted Points in action . . . saving time and money *on the job!* Atlantic Abrasive Corp., 526 Pearl St., South Braintree 85, Massachusetts.

Good Points to Remember



ATLANTIC ABRASIVE
CORPORATION
South Braintree 85, Massachusetts

of power race is taking place in England.

The open two-passenger sports car was not formerly considered a truly commercial venture, but the success obtained in the U. S. A. by such cars as the Jaguar XK 120 and the M.G. Midget have induced other manufacturers to tackle this field more seriously than before. The Austin-Healey, which was introduced at the 1952 Show, will now be entirely produced by the Austin firm and is competitively priced at £750 (without purchase tax of approximately 40 per cent). A speed kit for higher performance is available for this car as well as the Sunbeam Alpine. Another newcomer of 1952, the Triumph T.S.2, has been vastly improved in the meantime and is now scheduled for early delivery. The Standard Vanguard engine has been brought down to two liters in order to comply with F.I.A. sports regulation, but the output has been increased from 68 to 90 bhp. This car, as well as others, employs the manually-controlled overdrive by Laycock-de Normanville. This is, as a general rule, used in conjunction with top, or top and third gears only, and can be brought into effect by operating a manual switch.

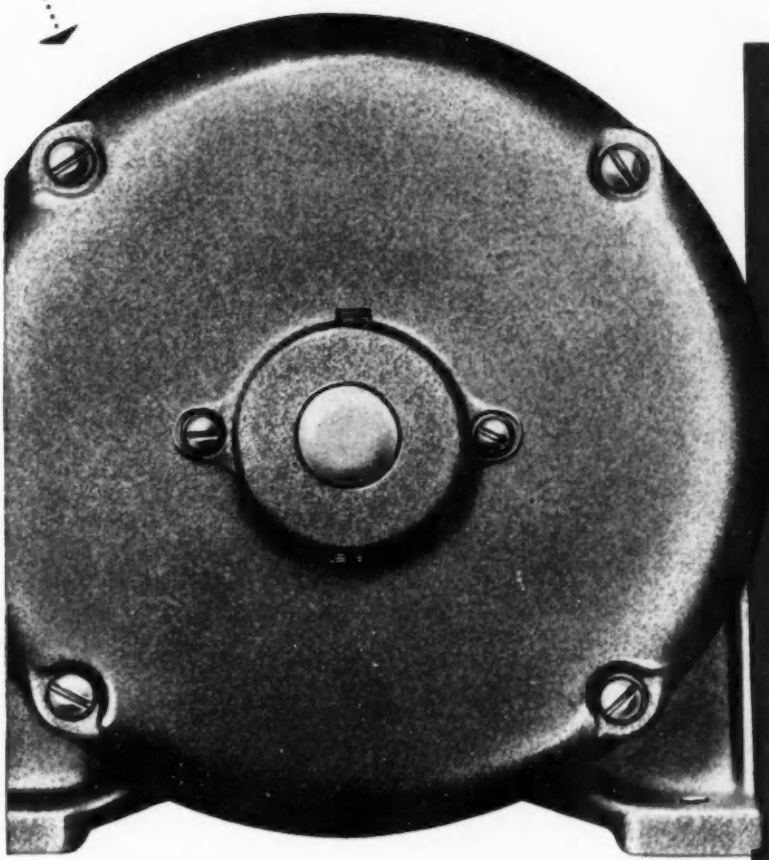
With the exception of the well known 1½ liter engine with four horizontally opposed cylinders, the new Jowett Jupiter R.4 is an entirely novel design. With a power output of 65 bhp at 5000 rpm in conjunction with a small frontal area and a low drag figure, a high performance is expected from this car which is mainly intended for competition work. Interesting features are a cooling fan driven by a small electric motor and linked to a thermostat. This provides a quite constant temperature of the coolant over a wide range of driving conditions and allows for a smaller radiator core to be fitted. The overdrive, in the case of the Jowett Jupiter, is mounted at an intersection of the drive shaft and reduces engine speed by 18 per cent.

The Jowett Jupiter R.4 is made only in a number of prototypes so far. The firm is encountering a difficult situation with regard to its Javelin sedan bodies, which up to now had been produced by the firm of Briggs. This having been taken over by the Ford (Dagenham) Co., the Jowett firm is not now able to continue production of the Javelin model. For the new sports car a composite body made of sheet steel and plastic parts has therefore been evolved.

Jowett was not the only firm trying to resolve body production problems

To get more service with less servicing...

replace with **Delco Motors**



Compare Delco motors with others. You will discover they have greater endurance under load... require minimum servicing ... for every type of Delco motor is designed, engineered and built to precision standards inside and out.

Whenever you need replacement motors ... fast ... call your local Delco wholesaler. Delco motors are available everywhere for immediate delivery.

THERE'S A DELCO
FOR PRACTICALLY ANY
INDUSTRIAL APPLICATION

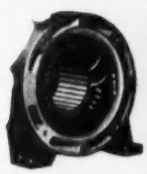
Open and enclosed motors up to 100 hp for standard foot mountings. NEMA C&D flange-mounted motors up to 30 hp. Explosion proof motors up to 20 hp.

THESE FEATURES KEEP DELCO MOTORS GOING LONGER

Water-Tight Conduit Box. Protects against moisture.

Positive Lubrication. Lengthens bearing life.

Delcote Insulation. Permanently flexible, moisture-proof, wear resistant.



Positioned Bearings. Maintain shaft alignment.

Dynamically Balanced Rotor and Shaft Assembly. Reduces vibration.

Corrosive-Resistant Cast Iron Frame. More solid, more rugged.

DELCO PRODUCTS

Division of General Motors Corporation, Dayton, Ohio

A GENERAL MOTORS PRODUCT — A UNITED MOTORS LINE

DISTRIBUTED BY WHOLESALERS EVERYWHERE

SALES OFFICES: Atlanta • Chicago • Cincinnati • Cleveland
Dallas • Detroit • Hartford • Philadelphia • St. Louis • San Francisco

by utilizing plastic material. The Singer Motors Ltd. is another concern which finds that production cost of bodies is one of the primary difficulties of the specialist car builder. Their new Singer SMX roadster is therefore another example of the polyester resin body reinforced by glass fiber, which could be a blessing for smaller firms if the various production snags encountered can eventually be overcome. The third example of a plastic body is the Jensen 541, a product of a commercial vehicle manufacturer. This high-performance coupe is a development of the firm's Interceptor range and uses a slightly tuned Austin four liter power unit. Only the rear part of the body is made of plastic.

Among the sports cars a new roadster by Daimler was a last-minute show surprise. This is a development of the Conquest 2½ liter family sedan with the two carburetor Special Series engine tuned to produce 100 bhp at 4600 rpm. This sports roadster is unique in possessing the well-known Daimler transmission consisting of a hydraulic coupling and a preselective Wilson planetary gearbox. Brake lining area has been increased from 148 to 190 sq in., and both the front and the rear brakes are amply provided with cooling air streams. Dry weight is approximately 2688 lb and a maximum speed of 100 mph is expected.

The Bristol Aeroplane Co. had previously concentrated on a fast four passenger sedan with its Automobile Division, and a new version of this, the 404 two four passenger coupe, can be considered as a sports car. The engine still basically resembles the German pre-war BMW type 328, but its power output has now been stepped up to 105, or 125 bhp in the case of the sports version. The wheelbase has been shortened to 96¼ in., and with a light alloy body the total weight is not much over one ton. Outward appearance shows signs of wind tunnel development work. The hood is exceptionally low, and the front air opening of the radiator resembles an aircraft intake. A separate opening for carburetor air is in front of a bulge on the hood. The rear fenders end in two small fins. Alfin compound brake drums wth cooling fins are used for the front wheels.

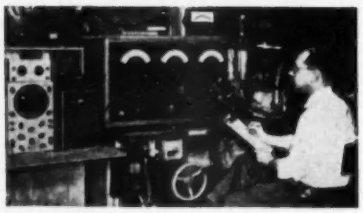
The slightly higher weight of the Aston-Martin DB2-4 2½ liter high performance car is balanced by a step-up in power output, which now is 125 bhp at 5000 rpm. The competition version of Aston Martin, the DB-3 S, which was exhibited in London, is of a different design, using a tubular frame, Porsche trailing link front suspension and a rear axle with a De Dion arrangement. A high compression three liter engine is fitted. A small production of this model is expected.

Another new sports car is the A.C. Ace, a two-liter car with a narrow tubular frame and independent springing all around. The tubular body frame is welded to the chassis frame and carries the aluminum panels of the spacious roadster body. No alteration is made to the Riley- and Alvis-engined Healey, but the Frazer-Nash sports car range has been supplemented by a closed competition coupe and an open roadster of similar design. The Bristol engine used in this car is tuned to give 100 or 140 bhp. Minor modifications are noted for Morgan and Allard models.

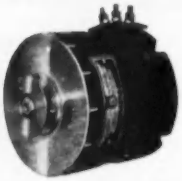
The proprietary engine maker, Coventry-Climax, showed a 2½ liter V-8 high performance engine suitable either for forthcoming formula 1 racing cars or hydroplanes. Two overhead camshafts per block and a cen-

BRING YOUR ELECTRICAL PROBLEMS TO Leece-Neville

In four decades of service to the automotive industry, Leece-Neville has developed the ability to design and produce special units. Our staff and equipment for this purpose are outstanding and we welcome the opportunity to custom-engineer special and heavy-duty electrical equipment to meet particular problems.



For Example: Alternator Systems



Leece-Neville has developed dozens of different models of AC-DC Alternator Systems for such applications as passenger car, truck, bus, off-highway, railroad and marine. They have been proved by performance for over 7 years.

Capacity ranges for various system voltages include: to 95 amps for 6 volt; to 180 amps for 12 volt; to 100 amps for 24 volt; to 50 amps for 32 volt.

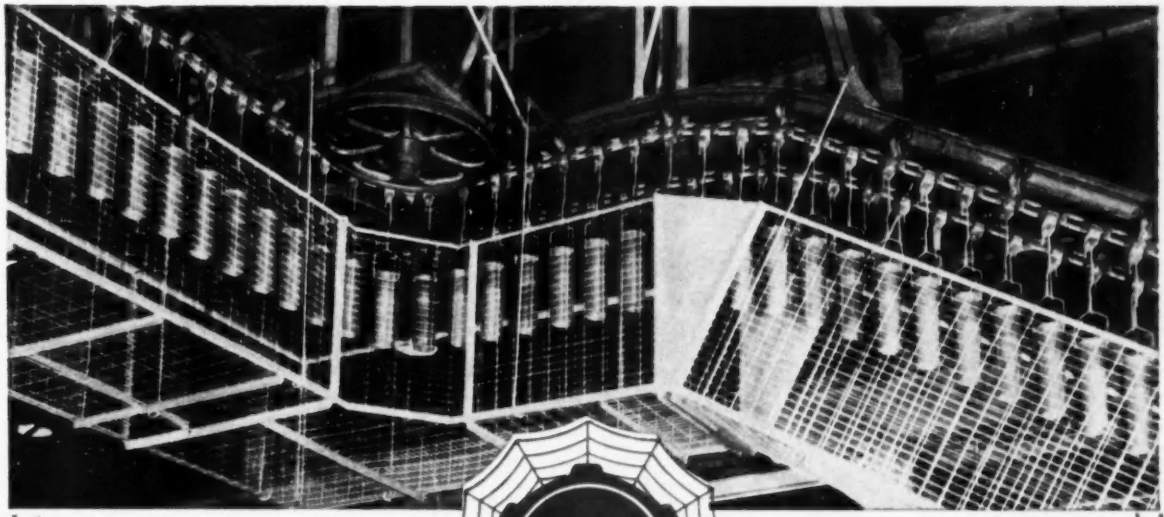
As in all Leece-Neville units, rugged design and precision manufacture combine to give L-N Alternators unmatched reliability and extreme life. Be sure to specify Leece-Neville. For all the facts, write The Leece-Neville Company, Cleveland 14, Ohio.

L-N custom-engineered products include:
ALTERNATOR SYSTEMS
D. C. GENERATORS
CRANKING MOTORS
SMALL MOTORS FOR HEATERS, etc.
REGULATORS
SWITCHES
AIR CRANKING MOTORS

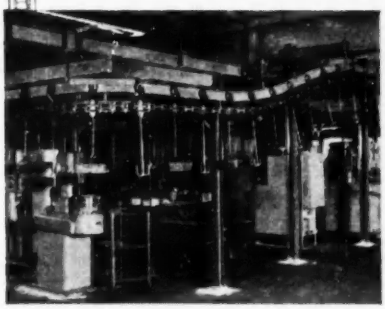
YOU CAN RELY ON Leece-Neville

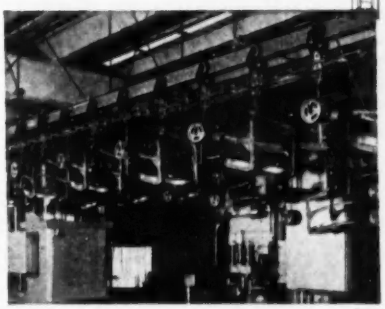
CUSTOM ENGINEERED
ELECTRICAL EQUIPMENT SINCE 1909

TRUCK BUS DIESEL OFF HIGHWAY
PASSENGER RAILROAD MARINE INDUSTRIAL



TROLLEY WEBB CONVEYORS





- Cut Costs
- Increase Production
- Reduce Damage

FOR CIVILIAN or DEFENSE PRODUCTION

Webb Conveyors are the pioneering pacemakers for industry. They make possible modern, straight line production methods . . . as important in a civilian as a defense economy.

Shells or guns, automobiles or agricultural implements, stoves or refrigerators, whatever the product, Webb Trolley Conveyors are equally efficient in slashing handling costs. They also reduce handling damage and increase production while utilizing the same amount of floor space.

In reality, Webb Conveyors can be termed machine tools. For, conveyors make possible the operation of machines at their most efficient speed by continuously feeding work to production personnel and then automatically removing the finished product.

If lack of modern materials handling methods is tying up your production, why not call in a Webb sales engineer for his recommendations? No obligation.

Additional Webb Services—Through its subsidiaries, Control Engineering and Webb Forging Co., the Jervis B. Webb Co. designs and manufactures electronic and electrical controls for conveyors, machine tools, etc. Also quality drop forgings.

JERVIS B. WEBB CO.

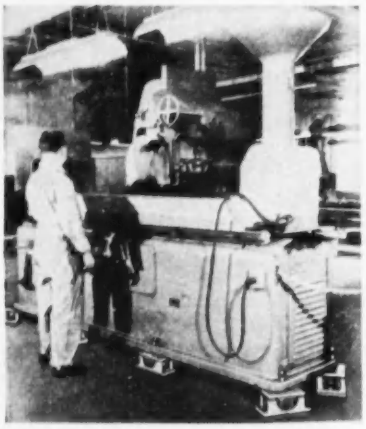
Conveyor Engineers and Manufacturers

8937 ALPINE AVENUE • DETROIT 4, MICHIGAN

Send for fully illustrated catalog that provides complete information on Webb conveyors

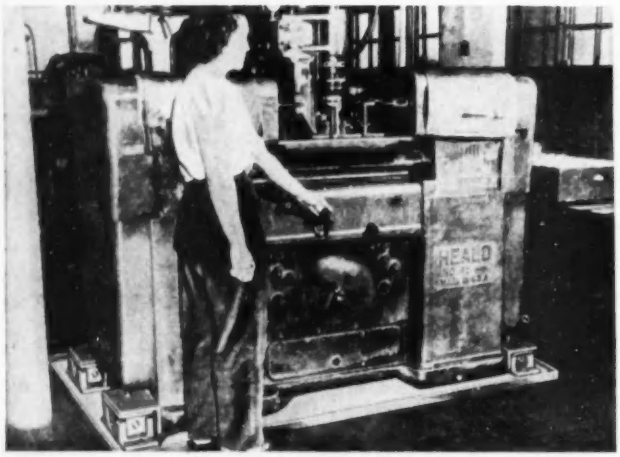
OFFICES IN PRINCIPAL CITIES • FACTORIES IN DETROIT, LOS ANGELES, HAMILTON, ONTARIO

STOP VIBRATION
WITH
KORFUND VIBRATION CONTROL



This Thompson 12" x 60" Surface Grinder is installed at Firth Sterling, Inc., Pittsburgh, Pa. Vibration from grinders affected precision testing equipment on floor below; vibration and noise was also extremely annoying in executive, sales and laboratory offices. Korfund Isolators directly under the grinders, completely solved the problem. Korfund Units stop vibration and insure quieter machine operation.

This Pratt & Whitney #3B Jig Borer is installed at Caterpillar Tractor Co., Peoria, Illinois. Korfund Vibro-Isolators protect this precision machine against severe external vibration from trucks and trains which had made accurate work impossible. Isolators are set in pockets made by removing wood block flooring. Korfund Units stop vibration and reduce rejects—improve work quality.



This is one of the Heald #49 Bore-Matics installed at Thompson Products Co., Cleveland, Ohio. Shock transmitted from one automatic boring machine to another caused intermittent skips and gouges. One machine had to be kept idle until both were mounted on Korfund Isolators. Now they operate together and turn out perfect work. Korfund Units stop vibration and increase production.

Korfund Vibration Control also: permits more efficient plant layouts, decreases original building and foundation costs, permits installations without reinforcement of floors, reduces machine maintenance costs, and lengthens machine life.

Standard Korfund Isolators are available for most applications. A Selector Chart giving recommendations for both normal and critical conditions is available. See Sweet's Catalog Files or write us for Bulletin No. 5.

For specific recommendations, contact us or your local Korfund office. A half century of experience is at your disposal.

KORFUND VIBRATION CONTROL — SPRINGS — RUBBER — CORK

THE KORFUND CO., INC.

48-02A Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

trally driven magneto are features of this very clean design expected to develop 250 bhp with racing fuel. The Perkins Diesel engine range now has two versions which can be used in passengar cars or taxicabs.

Although a great deal of development work had been carried out by both Dunlop-Girling and Lockheed with their respective designs of disk brakes, neither of them has so far been finalized for mass-production. Short lining life and excessive sensitivity to atmospheric conditions are still major problems to be coped with.

Whereas never before a similar number of foreign cars had been shown at a post-war London show, practically no modifications from the models exhibited in Paris were in evidence. The Borgward 1½ liter sports engine with overhead valves and pushrods is now developing 80 bhp. Among the American makes the Chrysler Corp. and Hudson were sole representatives of 1954 designs.

METALS——

(*Continued from page* 94)

Lead Market Firm

The lead price appears pretty well stabilized around 13½ cents per lb, which assures a little profit for the major producers here and abroad. London prices for the metal have been firm. The feeling persists that any change will be upwards. Stocks in the hands of consumers are believed to be low and buyers ask for immediate delivery. Imports of lead have been falling off and European demand is improving. After paying duty, freight, and handling charges there is no profit in arbitrage in lead between London and New York.

Chances appear good that the Tariff Commission will recommend some tariff increase for lead when its hearings are concluded. Instead of this, which would cause resentment abroad, a subsidy may be granted to domestic producers when and if the price falls below a set level, tentatively suggested at 14½ cents per lb.

Zinc Smelters to Cut Slab Output

Little encouragement was seen in the October figures released by the Zinc Institute. Stocks of slab zinc at the end of the month were reported at 158,400 tons, highest since 1947

(*Turn to page* 136, *please*)

Bendix Builds a Better *cable clamp* the AN3057B

Inexpensive • Efficient • Versatile

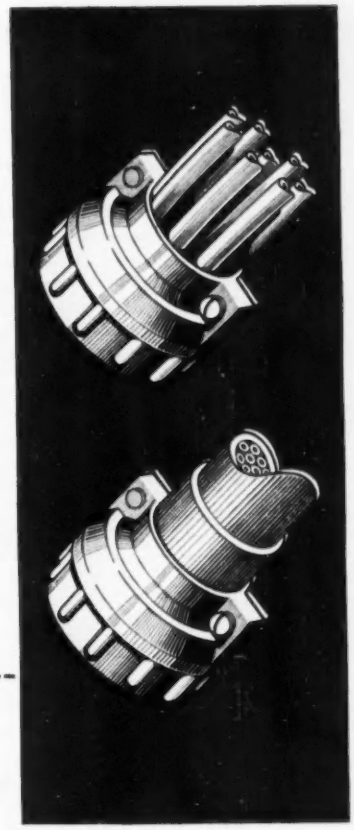
The new Bendix AN approved AN3057B cable clamp is now available. Engineered by Bendix to the highest quality standards, this cable clamp offers major design improvements. The clamping action is radial and completely eliminates wire strain and chafing by holding the wire bundle firmly in rubber. This clamp will accommodate a wide range of wire bundle sizes, but an even greater range can be handled through the use of the Bendix AN3420A accessory telescoping sleeve.

The new AN3057B cable clamp will also waterproof multi-conductor rubber covered cable on the rear of a connector, or where moisture-proof entrance through a bulkhead or into an equipment box is required.

This versatile clamp is a product of the Scintilla Magneto Division of Bendix Aviation Corporation and is a companion AN accessory to the world famous Bendix Scinflex line of electrical connectors. Write our Sales Department for details.

Outstanding Features

- Neoprene gland.
- Centered clamping action.
- Increased close down.
- Positive grounding feature.
- Cadmium plated die-cast aluminum nut.
- Shorter over-all length.
- Waterproofs multi-conductor cable.
- Immediate delivery.



Bendix

SCINTILLA MAGNETO DIVISION of Bendix AVIATION CORPORATION
SIDNEY, NEW YORK

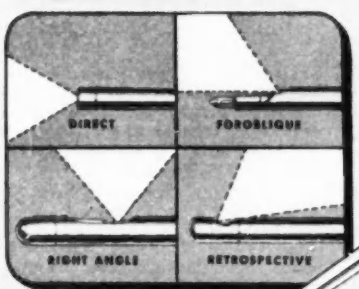
FACTORY BRANCH OFFICES: 117 E. Providencia Ave., Burbank, Calif. • 582 Market Street, San Francisco 4, California • Stephenson Bldg., 6560 Cass Ave., Detroit 2, Michigan • 615 Greenwood Ave., Jenkintown, Pa. • Brouwer Bldg., 176 W. Wisconsin Avenue, Milwaukee, Wisconsin. EXPORT SALES: Bendix International Division, 205 East 42nd St., New York 17, N. Y.

INSPECTION OF CONFINED AREAS FACILITATED

NECESSITY OF DISMANTLING AVOIDED

TIME SAVED—MONEY SAVED

A.C.M.I. BORESCOPES..



A. C. M. I. Borescopes are available in 4 angles of vision (as above) —in diameters of .120" to 4.00"—in lengths of 4" to 720". Special models for special problems.

The A.C.M.I. Borescopes permit close-up visual examination of interior areas and surfaces not otherwise visible. They save time and money, and prevent costly dismantling, by providing a practical solution to a wide variety of inspection problems.

In maintenance and inspection work, on small internal bores, machine parts or castings, to large boiler tubes, chemical plants, process equipment, or other industrial installations, an A.C.M.I. Borescope may be the answer to *your* problem.

Each Borescope is a compact, self-illuminated industrial telescope of highest quality, employing a precision optical system, that produces a flat visual field. Lens systems are fully corrected for color, spherical aberrations, and coma, with all lens surfaces coated to increase light transmission.

Write for free informational folder, or tell us your problem.

American Cystoscope Makers, Inc.

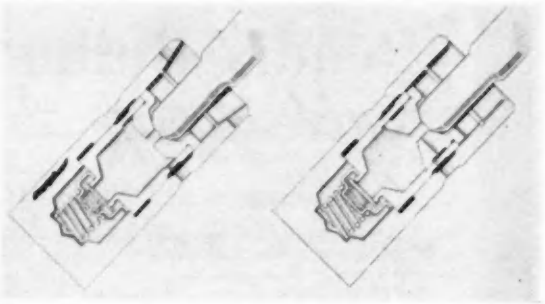
1241 LAFAYETTE AVENUE NEW YORK 59, N. Y.

Lincoln Improvements

(*Continued from page* 50)

tive acceleration from standing starts.

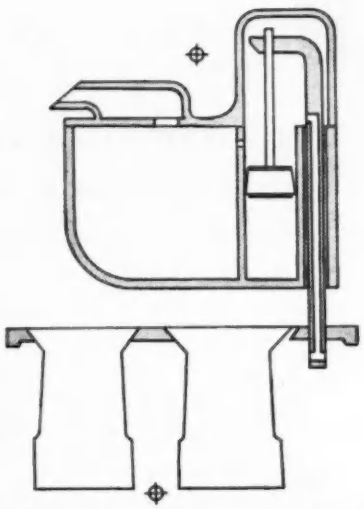
Hydraulic valve tappets for 1954 have been improved to eliminate the momentary noise on starting an engine after it has been standing idle for some time. This noise was caused by lack of sufficient oil in the tappet reservoir. Tappets have been redesigned and a flat has been added on the end of the push rod. With a higher oil level in the reservoir, there now is sufficient oil to fill the compression chamber at the start. The flat on the push rod provides a positive vent for any air that may be trapped in the reservoir.



Lincoln hydraulic valve lifters have been redesigned in detail to eliminate chatter upon cold starting. The 1954 design, with vent at the lower end of the push rod, is shown at the right. The previous design, shown for comparison, is at the left.

The filter element of the fuel pump now is made of special laminated paper stock, said to have nearly twice the efficiency of the former metal edge type. In addition, a U-shaped permanent magnet is located inside the filter element to catch microscopic ferrous metallic particles.

Greater rigidity in the hood and the front end has been obtained by a new, straight hood lock support plate rod, the lower end of which is attached directly to the frame. The steering column has also been made more rigid by the addition of a rod extending from the column support to the cowl. In addition, the area of the column supports has been reinforced by adding a brace to the dash and cowl top panels.



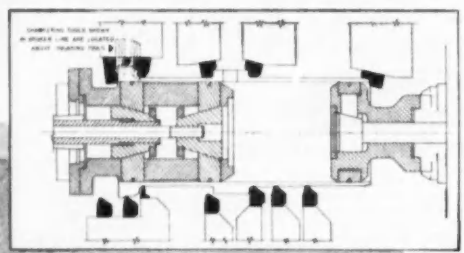
Cross-section through four-venturi carburetor showing operation of anti-percolating arrangement, the external vent being located at the lower end of the rod at the extreme right.

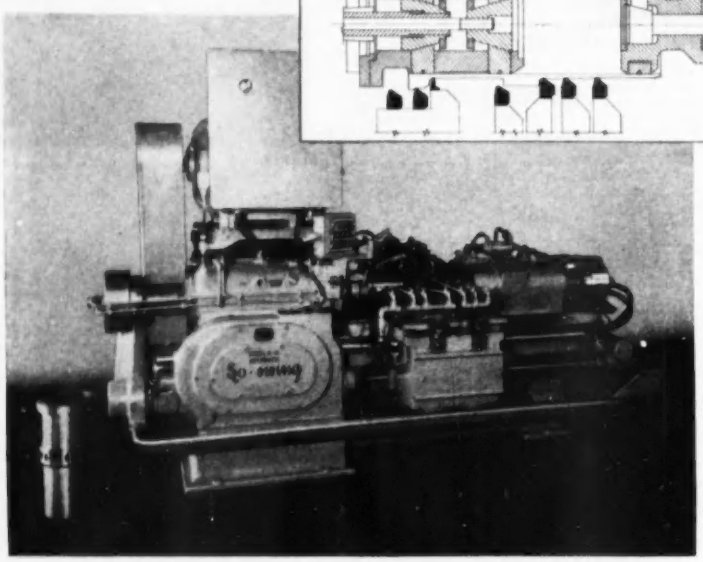
A noise suppression feature has

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

Details of arbor construction and location of 22 cutting tools.





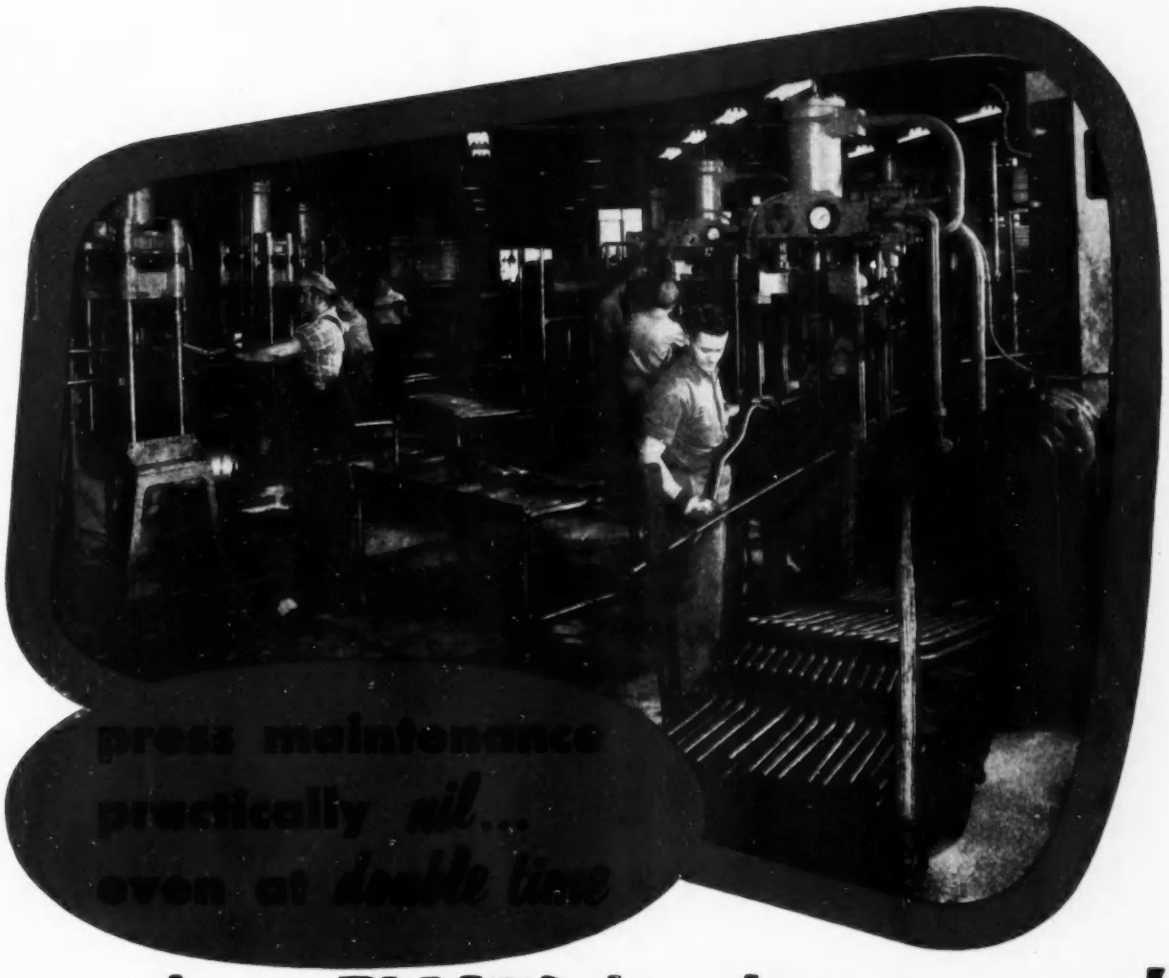
MODEL R-18 AUTOMATIC Lo-swing LATHE MACHINES LARGE CYLINDER LINERS AT FAST PACE

Problem: To turn outside diameters, face shoulders and chamfer large cylinder liners 11-1/2″ diameter by 22″ long.

Solution: The large swing Model R-18 Automatic Lo-swing Lathes selected for this job were equipped with special tailstocks and tooling engineered for this particular job. A 60 HP motor drives the machine.

Floor to floor time is 5.2 minutes, demonstrating the substantial economies that are possible with Lo-swing methods.

PRODUCTION COSTS ARE LOWER WITH Lo-swing



on these ELMES bending presses!

Six out of ten Elmes® Hydraulic Tube Benders in operation at Tube Products Corporation, Tipp City, Ohio, are shown above. Used for forming exhaust and tail pipes for automobile, airplane, and diesel engines, these six presses have been in service for four years; the remaining four Elmes presses, not shown, have been in service for eight years.

"These ten presses are in constant operation at least 8 hours daily," says Mr. E. C. Sonnanstine, Tube Products' executive vice-president. "In fact, at least 50% of the time they are in operation for 16 consecutive hours. Yet with all this heavy-duty operation, practically *no* maintenance has been required—only normal replacement of worn gaskets.

"We feel that the use of this equipment, with its simple tooling and exceptionally high operating speed, enables us to produce in quantities a quality product at the lowest possible cost to our customers."

Elmes Hydraulic Metalworking Presses have an enviable reputation for *maintaining* high production . . . because Elmes *builds* performance into its press designs . . . the kind of performance that only 102 years of specialized engineering experience can produce. Whatever your press requirements—for drawing, forming, straightening, bending, hobbing, forcing, etc. — let Elmes' long experience be your guide to better, faster, lower-cost production. Press recommendations and cost estimates are yours for the asking.

American Steel Foundries

ELMES ENGINEERING DIVISION

METAL-WORKING PRESSES • PLASTIC-MOLDING PRESSES • EXTRUSION PRESSES • PUMPS • ACCUMULATORS • VALVES • ACCESSORIES

METAL EDGE pays dividends in 3 ways

ADDS DISPLAY VALUE!

"Dealers are sold on our quality line *and* on our distinctive M. E. display box. Precision-printed to resemble fine leather . . . it protects our tapes . . . has re-use value for customers."

LICKS STORAGE PROBLEM!

"A new display for a new line doubled our box inventory . . . but created no storage problem! We store M.E. 'flats' for *both* lines in 20% of the space required for ordinary boxes."

SAFER HANDLING... FASTER INVENTORY!

"We use M.E. exclusively for materials handling and inventory control. Parts are fully protected during production, storage. We saved enough to pay for installation of the M.E. system after one inventory."

METAL EDGE—*the engineered method*—*has solved diverse packaging and handling problems in over 100 American industries.*

NATIONAL METAL EDGE BOX CO.

PACKAGING • MATERIALS HANDLING • INVENTORY CONTROL

1208 Callowhill Street, Philadelphia 23, Pa.

METAL EDGE

been incorporated on all tires to minimize tire squeal caused by the vibration of the outside shoulder ribs of the tires when the car is driven around a turn fast enough to cause these ribs to slide. Buttons or spacers have been added between the ribs of the tires to muffle the noise.

Development of a new throttle linkage has resulted in a smoother shift of the automatic transmission which is standard equipment on all models.

Power steering, power brakes, electric window lifts and four-way power seats are offered as optional equipment.

METALS

(*Continued from page* 132)

and nearly double the amount on hand last December. This was especially discouraging as the latest import figures showed a drop of nearly 20,000 tons from the lofty total of 84,500 tons per month reported in June and July. At the same time unfilled orders declined to only 26,000 tons.

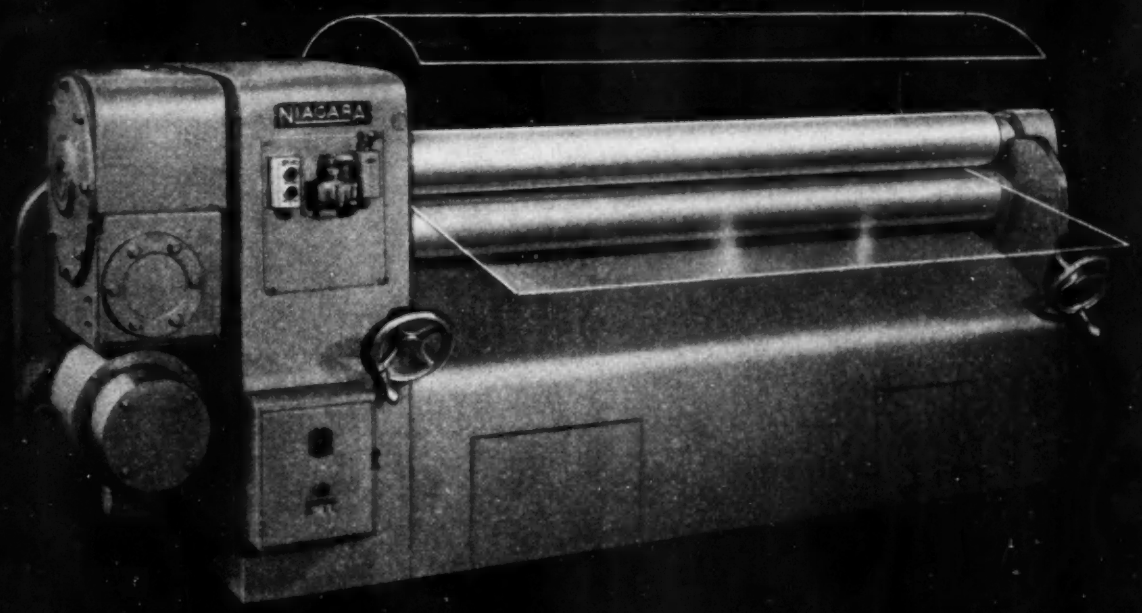
Domestic mine production of zinc continues to decline and is now below 40,000 tons per month, down about 30 per cent from the monthly average of 1952. Smelter production continued at a record rate of 84,000 tons in October and smelters are evidently digging deep into stocks of imported concentrates. Shipments of slab held up well at 67,100 tons, rebounding sharply. There was satisfaction that demand still remained good but for the zinc industry it is profitless prosperity.

At long last the zinc smelters have decided to do something about it and three major smelters announced immediate cutbacks in production of from 10 to 17 per cent, effective at once. At the same time representatives of the zinc miners descended on Washington to urge an increase in tariff to the maximum possible under existing law. According to the leading spokesman, domestic zinc mines can't break even at 10 cent zinc. He said they might be saved from extinction by an increase to 11½ cents which seems modest enough. A tariff increase on zinc from 0.7 cents to 2.1 cents per lb was advocated. Opposed were representatives of the Canadian zinc industry as well as the brass mill industry in this country who declared such an increase would be disastrous to them.

(*Turn to page* 138, *please*)

NIAGARA

ANNOUNCES



new all steel BENDING ROLLS

- Produces commercially true cylinders from thinnest sheets to maximum capacity.
- Rolls a multitude of bends in various shapes including oval forms, rectangular pipes, rounded end containers, cones etc.
- Pinch-type construction materially reduces flat spots on leading and trailing edges of work.
- All three rolls power driven permitting smaller diameters and easy operation with light gage sheets.
- Air operated drop end automatically tilts upper roll for easy removal of rolled cylinder.
- Power adjustment for rear roll saves time and effort.
- Roll position indicators allow operator to quickly duplicate roll settings for repeat jobs.
- Rapid reversal and positive jogging of rolls gives operator accurate control at all times.
- Magnetic brake on main motor prevents "drifting" of work, enabling operator to do accurate work without guessing.
- Unbreakable steel construction.
- No special foundation required.

6" Roll Series
Capacities 5/16"x 48";
3/16"x 72" and 12 ga x 120"

Write for new Bulletin 88

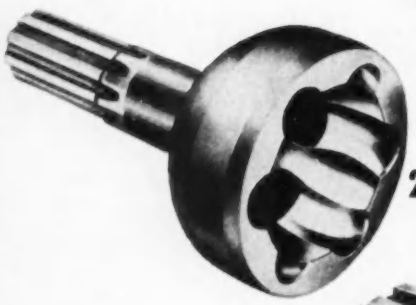
NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK • PHILADELPHIA

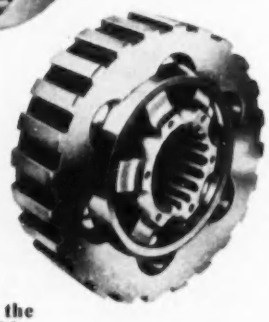
Dealers in principal U. S. cities and major foreign countries

YOU GET ALL 5 WITH THESE 2



1 CONSTANT VELOCITY
Transmits rotary motion from one shaft to another —uniformly, smoothly. Hardened steel balls roll in grooved raceways, providing true rolling action.

2 HIGHEST ANGULARITY
Up to 35°! No variation in relative angular velocity is possible.



3 HIGHEST CAPACITY
For size and weight, the most rugged performer you can select.

4 COMPACTNESS
Designed to work in the closest quarters possible. Compare dimensions before you specify any joint.

5 AND—LONG LIFE!
Constant Velocity builds in durability.

THE UNIVERSAL FAVORITE:
RZEPPA Constant Velocity UNIVERSAL JOINTS

Especially ideal for 4-wheel drives and many varied types of drive line applications . . . it eliminates the old problem of speed fluctuations in the driven shaft.

Before specifying any universal joint, compare ALL the factors that count. You'll find the very best costs a lot less than you think. For the complete Rzeppa performance and engineering story:

SEND FOR THIS CATALOG NOW→

JOINT DIVISION, THE GEAR GRINDING MACHINE CO.

3903 Christopher • Detroit 11

METALS

(*Continued from page* 136)

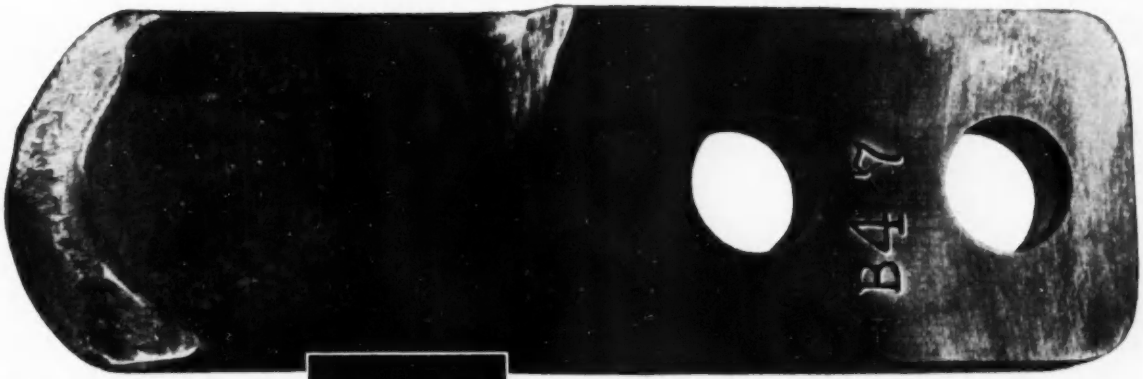
Copper Price Strong Despite Poor Statistical Position

The remarkable strength of the copper price in the face of an apparently unfavorable statistical position of the metal causes a lot of comment. With hardly an exception the trade felt sure several months ago that a price less than 29-30 cents per lb for the metal was inevitable before the end of the year. But on the contrary, a leading smelter recently advanced the price one-half cent, London has bid higher, and futures on the New York Commodity Exchange are up ¾ cents per lb over offerings that prevailed last summer for deliveries in 1954.

This is difficult to reconcile with the rather uninspiring figures for October disclosed by the Copper Institute. During the month industry stocks of copper increased by 11,400 tons to a peak level since 1949. At the same time crude production reached nearly 84,000 tons, again a record for over a year. Deliveries to fabricators of 110,500 tons in October were 6000 tons higher than the month before but were 26,000 tons less than the same month a year ago and substantially less than the monthly average in 1952. In summary, copper consumers are not taking all the domestic copper being produced plus imports, and a copper surplus appears in sight. This is even more pronounced abroad where copper stocks have increased alarmingly.

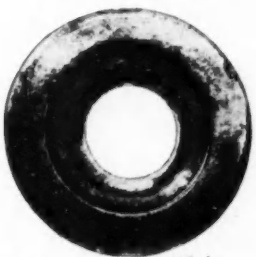
Disposition of Chile Copper Uncertain

The ultimate disposition of Chile's huge unsold copper stocks totaling 120-150,000 tons would ordinarily create uncertainty in the market. As long as it appeared that this metal would be quietly transferred to the national stockpile and immobilized as a market factor there was no great concern. But Chile's apparent withdrawal from further negotiations in Washington changed the whole picture along with rumors that Russia was angling to take over the Chile copper at a substantially higher price than 30 cents. This would be an abrogation of the Mutual Defense Pact signed in 1952 and would doubtless bring stern condemnation and probable reprisal from the United States.



This punch gave double service!

This block had double life!



This die lasted 50% longer!

B-47 HOT WORK STEEL

gives you more runs for your money

. . . anywhere from 1½ to 5 times the Performance!

SOME TYPICAL EXAMPLES

B-47 dummy blocks, vs. 9% and 12% tungsten types, extruded more than twice as many brass and copper tubes. B-47 dies outperformed 12% tungsten type 1½ to 1.

B-47 punches, vs. low-carbon 18-4-1 type, hot pierced more than twice as many eyes in steel axes. See top picture.

B-47 die inserts, vs. 9% tungsten types, hot pressed more than twice as many steel side gear forgings. B-47 die inserts, vs. regular insert material, performed better than 5 to 1.

B-47 dummy blocks, vs. 5% tungsten-5% chromium types, extruded twice as many copper and brass tubes and rods. B-47 dies outperformed 12% tungsten-12% chromium type.

B-47 punches, vs. 5% chromium type, hot extrusion forged 1½ times as many automotive steel front axle spindles.

B-47 die inserts, vs. 9% tungsten types, extruded 1½ times as many high alloy steel automotive valves. This is considered a very difficult job for any grade of hot work steel.

SEND NOW

for "Blue Sheet" on Grade B-47

This four-page folder gives technical data on B-47 for brass extrusion dummy block and dies, valve extrusion die inserts, hot punch tools, forging die inserts, press forging dies, and hot work in general. *Write for your copy today.*

ADDRESS DEPT. AI-49

Looking for a better hot work steel? You'll find it in B-47—an improved chromium, tungsten, cobalt, vanadium type whose superiority is established by actual performance runs such as those summarized above. All tests show that B-47 has unusual resistance to shock and abrasion at elevated temperatures.

Developed originally for applications in the copper and brass industry, B-47 has given excellent results on difficult hot work jobs on steel. B-47, when properly heat treated, exhibits a well rounded combination of red hardness, toughness, and resistance to wear and heat checking that makes it a valuable addition to the Allegheny Ludlum group of hot die steels.

Put B-47 to the test. You'll find that it will do any number of severe hot work jobs without washing out or changing size. Get in touch with A-L, today. Let us help you to use B-47.

● *Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

For complete **MODERN** Tooling, call

Allegheny Ludlum

AL FINE TOOL STEELS SINCE 1854

WAD 3530

WHAT YOU SHOULD KNOW ABOUT THE Sperry ULTRASONIC TESTING REFLECTOSCOPE

OUR NEW BULLETIN 50-105 tells you in just eight pages exactly *how*, *where* and *why* this latest development in nondestructive testing instruments can cut your production and maintenance costs.

THE ULTRASONIC REFLECTOSCOPE is the unique, portable instrument that enables you to "see" inside a variety of metals and other materials. By means of a distinct pattern on a cathode ray tube, it enables you to locate and evaluate—*quickly* and *economically*—both surface and internal defects.

WHATEVER THE SIZE OF YOUR PLANT, applications are unlimited. You can *cut wasted machine- and man-hours* through fast, accurate quality-control of raw materials and machined parts. You can eliminate serious production delays through discovering fatigue cracks in your heavy equipment *before they lead to breakdown.*

OPERATION is simple – all electronic circuits are practically automatic. Penetration is deep – 30 feet, for example, in solid steel.

THE REST OF THE STORY is contained in our new bulletin. To get your copy immediately, fill out and mail the attached coupon today.

The unique, economical Reflectoscope is now cutting production and maintenance costs in plants of all types and sizes.

SPERRY PRODUCTS, INC.
Leader Since 1928
in Nondestructive Testing

Sperry Products, Inc. AH2
Shelter Rock Road
Danbury, Connecticut

☐ Please send me a copy of your new Bulletin 50-105. ☐ Have your representative call.

Material to be tested .....
Name .....
Title .....
Company .....
Address .....
City ..... Zone ..... State .....

CALENDAR

OF COMING SHOWS AND MEETINGS

American Society of Mechanical Engineers, annual meeting, Statler Hotel, New York, N. Y. Nov. 29-Dec. 4

Chemical Industries Exposition, Philadelphia, Pa. .....Nov. 30-Dec. 5

Chemical Specialties Manufacturers Association Meeting, Hotel Mayflower, Washington, D. C.....Dec. 7-8

American Society of Agricultural Engineers, winter meeting, Edgewater Beach Hotel, Chicago, Ill. .....Dec. 7-9

1954

SAE Annual Meeting, Sheraton-Cadillac Hotel and Hotel Statler, Detroit, Mich. .... Jan. 11-15

National Motor Boat Show, Bronx, N. Y. ..... Jan. 15-23

World Motor Sports Show, New York, N. Y. .....Jan. 23-31

Plant Maintenance & Engineering Show, Chicago, Ill. .....Jan. 25-28

Society of Plastic Engineers, 10th annual technical conference, Royal York Hotel, Toronto, Ont. ..... Jan. 27-29

Chicago National Boat Show, Chicago, Ill. .....Feb. 5-14

International Motor Sports Show, New York, N. Y. .....Feb. 6-14

National Transport Vehicle Show and Fleet Maintenance Exposition, New York, N. Y. . Feb. 17-19

American Society for Testing Materials, spring meeting, Shoreham Hotel, Wash., D. C.....March 1-5

SAE National Passenger Car, Body, and Materials Meeting, Hotel Statler, Detroit, Mich. .....March 2-4

Pacific Automotive Show, Seattle, Wash. .....March 4-7

Geneva Automobile & Truck Show, Geneva, Switzerland .....Mar. 11-21

SAE National Aeronautic Meeting, Statler Hotel, New York, N. Y. .....April 12-15

International Motor Show, Turin, Italy .....April 21-May 2

ASTE Industrial Exposition, Philadelphia, Pa. .....April 26-30

American Welding Society, spring technical meeting, Hotel Statler, Buffalo, N. Y. .....May 4-7

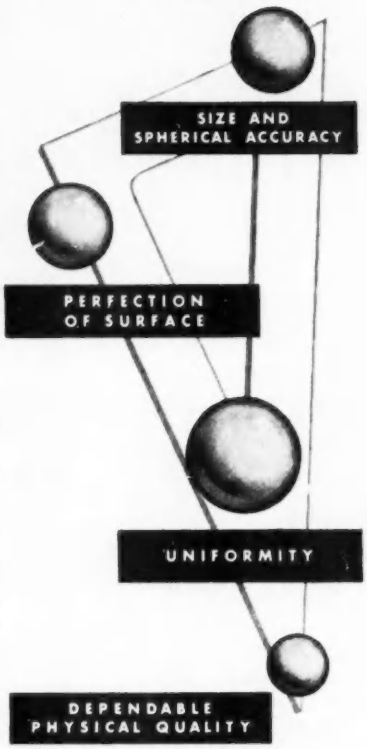
International Aviation Trade Show, New York, N. Y. .....May 5-7

Annual Foundry Congress and Show, Cleveland, Ohio.....May 8-14

Basic Materials Exposition, Chicago, Ill. .....May 17-20

Canadian International Trade Fair, Toronto, Canada .....May 31-June 11

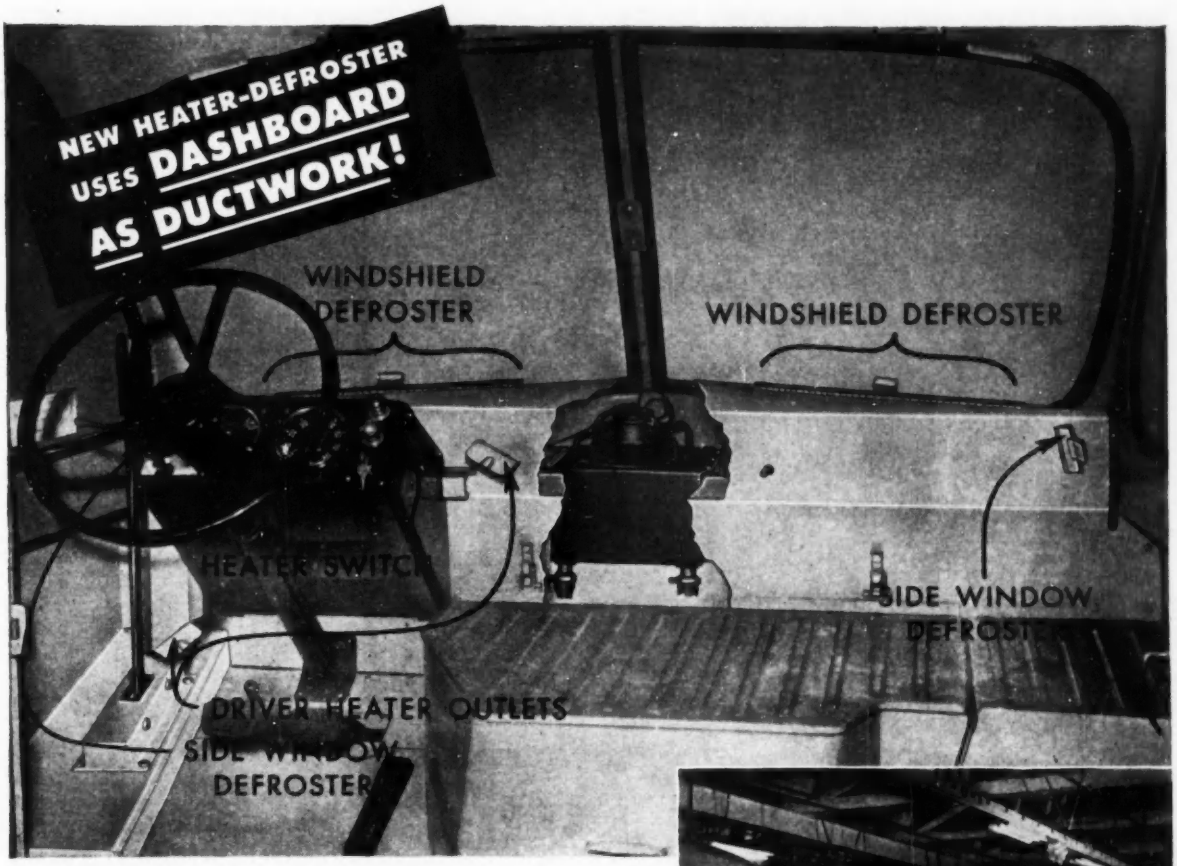
from any angle



STROM *is your* **BEST BALL BUY**

If you have a metal ball problem, why not let Strom solve it for you. Whether for precision ball bearings or for one of many other ball applications . . . Strom will supply the *right* ball to meet your requirements. For more than a quarter century, industry has looked to Strom for metal balls of unsurpassed quality.

Strom STEEL BALL CO.
Largest Independent and Exclusive Metal Ball Manufacturer
1850 So. 54th Ave., Cicero 50, Ill.



Engineered by EVANS

FOR INSTALLATION ON THE TRUCK ASSEMBLY LINE

This remarkable heater-defroster is a fine example of the advantages of Evans custom engineering service. Working hand in hand with the customer's engineering department, our engineers produced a unit radically different in concept that solved a difficult heating and ventilating problem. The Evans organization is staffed to engineer units to specification, organized to build prototypes quickly, equipped to conduct precision tests to latest A.S.H.V.E. procedures. If your needs are for high performance,–ruggedly constructed equipment—it will pay you to consult Evans Products Company, Heating & Ventilating Division, **Dept. P-12**, Plymouth, Mich.

EVANS

CUSTOM HEATERS

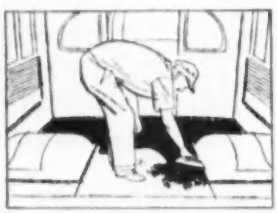
BALANCED HEATING AND VENTILATING SYSTEMS FOR EVERY TRUCK AND BUS

Evans engineering brings you

OUTSTANDING ADVANTAGES LIKE THESE

- Heater-Defroster is an integral part of the body construction.
- Unit heats driver position, entire body compartment and windshield area with only 5% variation between rear door and front door.
- Oversize defroster vents, in conjunction with built-in system of ductwork, perform triple service—heating, defrosting, and pressurizing.
- Compact powerful heater delivers 20,000 Btu output at 175 CFM, with only 7 amp. draw on a six volt system.
- Heater unit completely protected—out of sight yet readily accessible for service—on top of engine position permits extremely short water lines.

Setting safer paths for little feet



The designers and manufacturers of America's school buses place great emphasis on all details pertaining to passenger safety. Safe, non-slip flooring is one of the essentials—and Superior Coach Corporation at Lima, Ohio, uses a 3M Adhesive to anchor floor matting to the steel floors of their school buses.

Superior has standardized on a 3M rubber-based adhesive for this operation because they need fast application and a quick, strong bond that will stand up under vibration, temperature changes and strong cleaning solutions.

See what adhesives can do for you . . .

3M's rubber-based adhesives provide a fast, low-cost way of joining a variety of materials. Like to see some actual examples of what other companies are doing with 3M adhesives? Ask your 3M salesman for a copy of our new Design Handbook, or write today to 3M, Dept. 1012, 417 Piquette Ave., Detroit 2, Mich.

3M COMPANY

ADHESIVES•COATINGS•SEALERS

MINNESOTA MINING AND MANUFACTURING COMPANY
ADHESIVES AND COATINGS DIVISION • 417 PIQUETTE AVE., DETROIT 2, MICHIGAN
GENERAL SALES OFFICES: ST. PAUL 6, MINN. • EXPORT: 122 E. 42 ST., N.Y. 17, N.Y. • CANADA: LONDON, ONT.

MAKERS OF "SCOTCH" BRAND PRESSURE-SENSITIVE ADHESIVE TAPES • "SCOTCH" BRAND SOUND RECORDING TAPE • "SCOTCHLITE" BRAND REFLECTIVE SHEETINGS • "3M" ABRASIVE PAPER AND CLOTH • "3M" ADHESIVES AND COATINGS • "3M" ROOFING GRANULES • "3M" CHEMICALS

For longer equipment life and improved product performance, specify General Electric's new Silicone Rubber Coating Compound, SE-100, on glass-cloth tapes, ducting, gaskets and seals

● General Electric's new silicone rubber coating compound offers a combination of heat life, electrical properties and abrasion resistance superior to any other silicone rubber coating material. Ideal for both electrical and mechanical applications, SE-100 is designed for coating glass or organic fabrics for service at high or low temperatures or where resistance to weather, ozone, corona or chemicals is required. Available also as a dispersion (SE-100S), or as a flame-retardant compound (SE-101), this new G-E silicone product is excellent for coating glass sleeving and glass-served wire.

Ask your fabricator to tell you more about how SE-100 extends equipment life, minimizes insulation failures and improves product performance.

GENERAL ELECTRIC

CLIP AND MAIL TODAY!

General Electric Company
Section 351-SC
Waterford, New York

Please send me product data on SE-100, list of fabricators, and a free copy of *G-E Silicones for Industry*. I want this information for ☐ Reference purposes only ☐ An immediate application on:

☐ Cloth, tape or sleeving ☐ Glass served wire
☐ Encapsulating ☐ Ducts, gaskets and seals

Name _____ Position _____

Firm _____

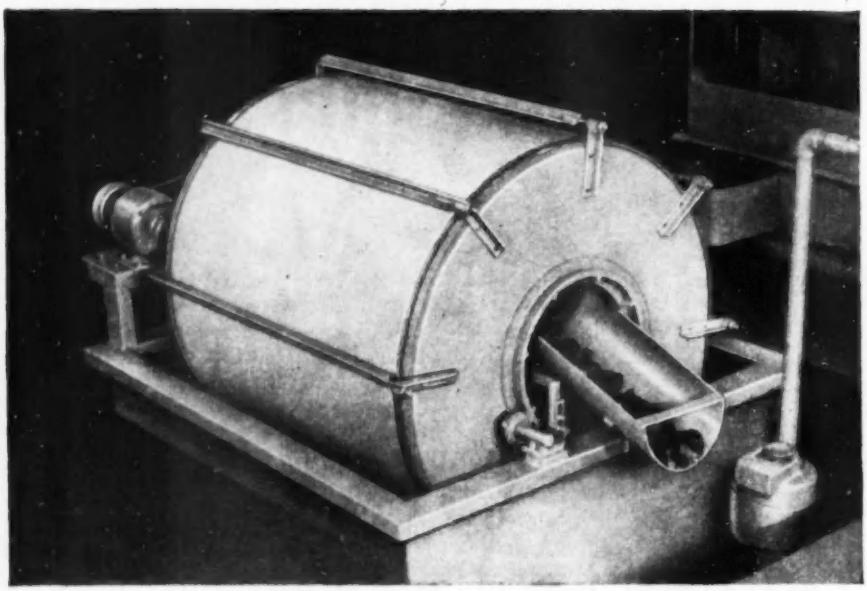
Street _____

City _____ Zone _____ State _____

IN CANADA: Mail to Canadian General Electric Company, Ltd., Toronto

The MURRAY WAY INDUSTRIAL FILTER

A Revolutionary Development in Solution Reclamation That Gives You These Money-Saving Features!



- **AUTOMATICALLY OPERATED**
- **SELF-CLEANING**
- **ECONOMICAL**
- **COMPACT**
- **ADAPTABLE**

The Murray-Way Industrial Filter automatically rotates fresh filtering area into position while simultaneously ejecting the contaminant.

With this new unit costly consumption of throw-away filtering media is eliminated since the wire filtering screen has many times the life of cloth filtering webs.

The Murray-Way Industrial Filter is a compact unit. It offers unusually great filtering capacity in proportion to area occupied.

Amazingly adaptable, the Murray-Way Filter may be used with an individual machine unit or as a central filtering station for many units. Capacity of filtration may be easily increased by adding filters in tandem—separately or in the same tank, to meet requirements. A selection of filtering screen material and size of screen opening can be supplied in monel, stainless steel, brass or bronze to fit your requirements.

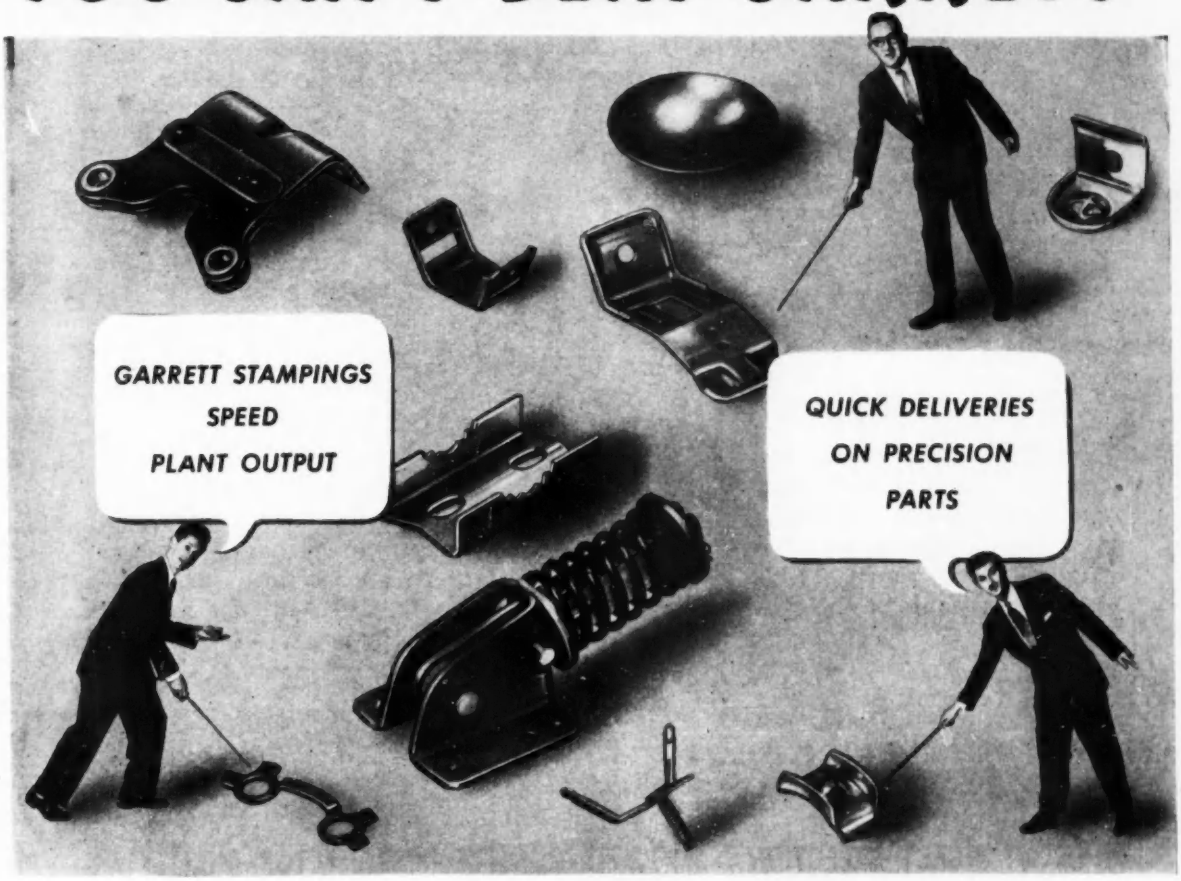
For technical details of operation—write for Bulletin F-5301.

MURRAY WAY **THE MURRAY-WAY CORPORATION**

POST OFFICE BOX 180 — BIRMINGHAM, MICHIGAN

AUTOMATIC POLISHING, BUFFING, GRINDING EQUIPMENT

YOU CAN'T BEAT GARRETT



STAMPINGS

Save time, trouble and expense by making Garrett your subcontractor on small and medium metal stampings. Garrett has the "know-how" to meet your most rigid specifications. Three modern plants, automatic high-speed presses up to 150-ton capacity, and up-to-date tool shop provide highest quality of workmanship. Finishing equipment includes tumbling, polishing, sand blasting, heat treating and plating.

To speed production, reduce costs, improve quality, make Garrett your headquarters for metal stampings.

OTHER PRODUCTS MANUFACTURED BY
GARRETT
SPRING LOCKWASHERS
Greater holding power, with controlled tension for tighter assemblies. Wide choice, plated to your needs. Delivery from stock.
FLAT WASHERS
Most complete line of washers in the world. To all civilian and Armed Forces specifications.
HOSE CLAMPS
AIRCRAFT AN737 Stainless steel radial type
MULTI-CLAMP (QS100 & AN748) worm type screw hose clamp
AUTO-SEAL the inexpensive high quality hose clamp

Garrett
OF PENNSYLVANIA

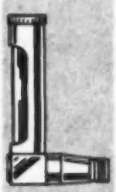
GEORGE K. GARRETT COMPANY, INC. PHILA. 34, PA.

LOOK TO THE LEADER... FOR LUBRICATING DEVICES

GITS

40 YEARS' LEADERSHIP

Yes, for 40 years GITS has been setting the standard for industry . . . solving tough lubricating problems . . . earning the confidence of manufacturers . . . it's the reason people say, "Call GITS first".



LOW COST

Yes, GITS oil cups can do a complete lubricating job for you . . . prolonging bearing life, reducing maintenance costs, cutting down-time, boosting production . . . and GITS oil cups cost so little.

WORLD'S LARGEST SELECTION

Yes, only GITS can offer you such a wide range of standard stock sizes. From *just one* source you can get *all* lubrication devices in *any design* for *any purpose.*

CONSISTENT TOP QUALITY

Yes, GITS is known for uniform quality in design, materials and machining . . . this means constant, dependable performance for you. Inferior products can cost you time and money. Demand the best . . . get GITS.

Oil Hole Covers • Oil Cups • Grease Cups • Bottle Oilers • Gauges • Gravity-Feed • Wick-Feed Constant Level • Vibrating Rod Styles • Threaded or Drive-Type • Elbow or Straight

GITS BROS. MFG. CO.

1870 S. Kilbourn Ave. Chicago 23, Ill.

Write today for Free Catalog No. 60A. Use it as your handy reference for lubricating devices.

If you make any parts like these . . . .

- Piston Pins
- Pump Cylinders
- Axles (front and rear)
- Bearing (Races)
- Airbrake Parts
- Drag Links
- Table Rollers
- Exhaust Lines
- Drill Shanks
- Frame Spacers
- Grease Guns
- Armature Bodies
- Hydraulic Brake Lines
- Filler Tubes
- Hydraulic Hoist Cylinders
- Ignition Wire Tubes
- Radio Parts
- Bushings
- Jacks
- Gun Barrel Drills
- Axle Housings
- Propeller Shafts
- Bobbins
- Push Rods
- Rocker-Arm Shafts
- Hollow Spindles
- Shock-Absorber Casings
- Spring Bushings
- Ironer Rolls
- Tie Rods
- Drill Collars
- Torque Tubes
- Spool Holders
- Golf Shafts
- Transmission Parts
- Spindle Caps

you can make them *better, faster and at less cost*

with SHELBY SEAMLESS STEEL TUBING

BECAUSE Shelby Seamless comes to you with the basic shape and hole already made you can eliminate or greatly reduce many time and labor-consuming operations connected with boring and machining. You also save the wear and tear on expensive tools, as well as the needless waste of steel.

Another important advantage in using Shelby Seamless Tubing is that its excellent machining characteristics and uniformity speed up production and improve the quality of your output. *You can turn out parts by the millions and the last part will be as metallurgically and dimensionally accurate as the first part produced.*

Shelby Seamless Steel Tubing is available in a complete range of sizes; in different wall thicknesses; various finishes and steel analyses. Our engineers will be glad to submit recommendations based on a study of your particular requirements.

All Shelby Seamless Tubing is pierced from solid billets of uniform steel. This is the one manufacturing method that assures absolute uniform wall strength.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S SHELBY SEAMLESS MECHANICAL TUBING

USS

UNITED STATES STEEL

Here is the PARKER LINE

metal surface treatments that aid production, improve product quality, enhance appearance and durability...

BONDERITE

corrosion resistant paint base

This well-known product is used to prepare metal for fine baked paint finishes on thousands of products. Automobiles, trucks, refrigerators, domestic appliances of all kinds, control boxes, metal furniture, office partitions, transformers, and toys are a few of the types of products on which Bonderite is used.

Applied by either spray or immersion, Bonderite creates a nonmetallic phosphate coating over the entire surface. This coating is integral with the metal surface, forming an effective barrier against the penetration of moisture, and furnishing an excellent base for paint.

Bonderite produces dependable results of uniformly high quality, is easily controlled and economical in operation. It may be used to treat steel, aluminum, zinc, and cadmium.

Bonderite adds durability and appearance protection to painted metal by combating corrosion and anchoring the paint securely.

PARCO COMPOUND

rust resistant

This is the standard corrosion protection for iron and steel.

Iron and steel parts to be treated are immersed in Parco Compound solution, which creates a nonmetallic crystalline phosphate coating over all the surfaces of the metal. Complex shapes of all sizes from steel boat plates down to nuts, bolts and screws are treated with Parco Compound. Treatment is simple, controls are easily maintained, and cost is extremely low.

BONDERITE and BONDERLUBE

aids in cold forming of metals

These two Parker products are a big factor in accomplishing the present revolution in cold forming techniques. Nonmetallic Bonderite, used in tube mills for many years to hold lubricant, protect dies from excessive wear, and allow greater reductions—combines with the amazingly effective Bonderlubes to transform problem draws and extrusions into production routine.

The combination of Bonderite and Bonderlube is used extensively in the manufacture of shells and cartridge cases, shafts, gears and pins, making important savings in time, money, and material.

PARCO LUBRITE

wear resistant for friction surfaces

The nonmetallic phosphate coating created by this Parker Product reduces wear on friction parts and bearing surfaces. It is used on gears, pistons, piston rings, shafts, valves, pinions, cylinder linings, cams and other automotive and machine components.

Parts are treated by immersion in Parco Lubrite solution. The coating produced by this treatment prevents metal-to-metal contact, holds lubricants, reduces danger of galling and scratching, prolongs service life by protecting mating parts during the critical break-in period.

PARCOLACS

special finishes

Parcolacs are a group of special finishes to be used over Parco Compound. They include wax base finishes, stains, and rust preventive oils suitable for application by dip, spray, or centrifuge. There are types to meet slow or fast drying requirements, and other desired specifications. Parcolacs add to the appearance and performance qualities of the articles treated.

NEW! PARCOLAC BLACK AND PARCOLAC ALUMINUM

Two new Parcolac finishes can now be used over Parco Compound to enhance appearance and add greater corrosion resistance. Parcolac black and Parcolac aluminum are phenolic type finishes, applied by centrifuge, with excellent color and appearance and especially good resistance to corrosion. Excellent for parts that will be called on to withstand severe exposure and maintain good appearance.

ENDURION

corrosion resistant treatment in gray and olive drab

Two distinctive immersion treatments designed to react chemically with Parco Compound coatings to produce superior corrosion resistance. Easily controlled, simple to operate, Endurion produces uniform coatings which do not materially change the dimensions of the parts being treated. Very little additional equipment is required.

Endurion treatments are recommended where increased corrosion resistance is specified or where the chemically produced permanent colors are required.

PARCO CLEANERS

metal cleaners and conditioners

This line of scientifically formulated metal cleaners includes alkali, acid, and emulsion type cleaners. They not only remove grease and soil from the metal, but condition it for the next step in finishing. The line is complete, and includes one that can meet your production cleaning requirements.

**Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U. S. Pat. Off.*

MAINTENANCE PAINTS. A complete line of maintenance paints manufactured for 70 years by The Tropical Paint & Oil Co., subsidiary of Parker Rust Proof. A product to meet each and every one of your maintenance paint problems.

PARKER

RUST PROOF COMPANY

2178 E. MILWAUKEE AVENUE • DETROIT 11, MICHIGAN

Since 1915— leader in the field

PARKER PRODUCTS MEET GOVERNMENT SPECIFICATIONS

Complete list of Parker Products which meet government specifications available. Write for your copy!

PARKER RUST PROOF COMPANY
2178 E. Milwaukee, Detroit 11, Mich.

Please send me information on the products I have listed below:

_____

_____

_____

Name _____

Firm _____

Address _____

"57,000 Investors in Democracy"

HENRY FORD II

President, Ford Motor Company

"In the most practical way possible—the regular purchase of U.S. Savings Bonds—millions of Americans are demonstrating complete confidence in our form of government. Investors in democracy, they are freely staking their personal security on a fundamental faith in the future of our nation. I am proud that today more than 57,000 Ford Motor Company employees are participating in the Payroll Savings Plan. Last year they bought bonds worth $25,000,000 at face value, and this year the total of their purchases will be even greater. Through their thrift they are helping to keep America strong."

Few investment groups are as important to America as the members of the Ford Payroll Savings Plan. They are *important* in size—57,000 men and women . . . important in buying power—they actually purchase $25,000,000 in Savings Bonds every year . . . and *very* important to our economic stability—"through their thrift they are helping to keep America strong."

"Oh," someone may say, "Ford is a big company and they do things in a big way. It's easy for Ford to get thousands of people to sign up for the Payroll Savings Plan."

It was relatively easy for Ford, and it is easy for any company, large or small, to build a good Payroll Savings Plan *if*—(1) The head of the company recognizes the importance of the Payroll Savings Plan to the employees, the company, and the country; (2) *If* he will show the same degree of personal interest that Mr. Ford takes in the Ford Payroll Savings Plan.

If you would like to match Mr. Ford's Payroll Savings record—percentage-wise, of course—all you have to do is to see to it that a Payroll Savings Application Blank is placed in the hands of every man and woman in your company. It will help, of course, if you remind them, over your signature, that the Payroll Savings Plan is a safe and sure road to personal security.

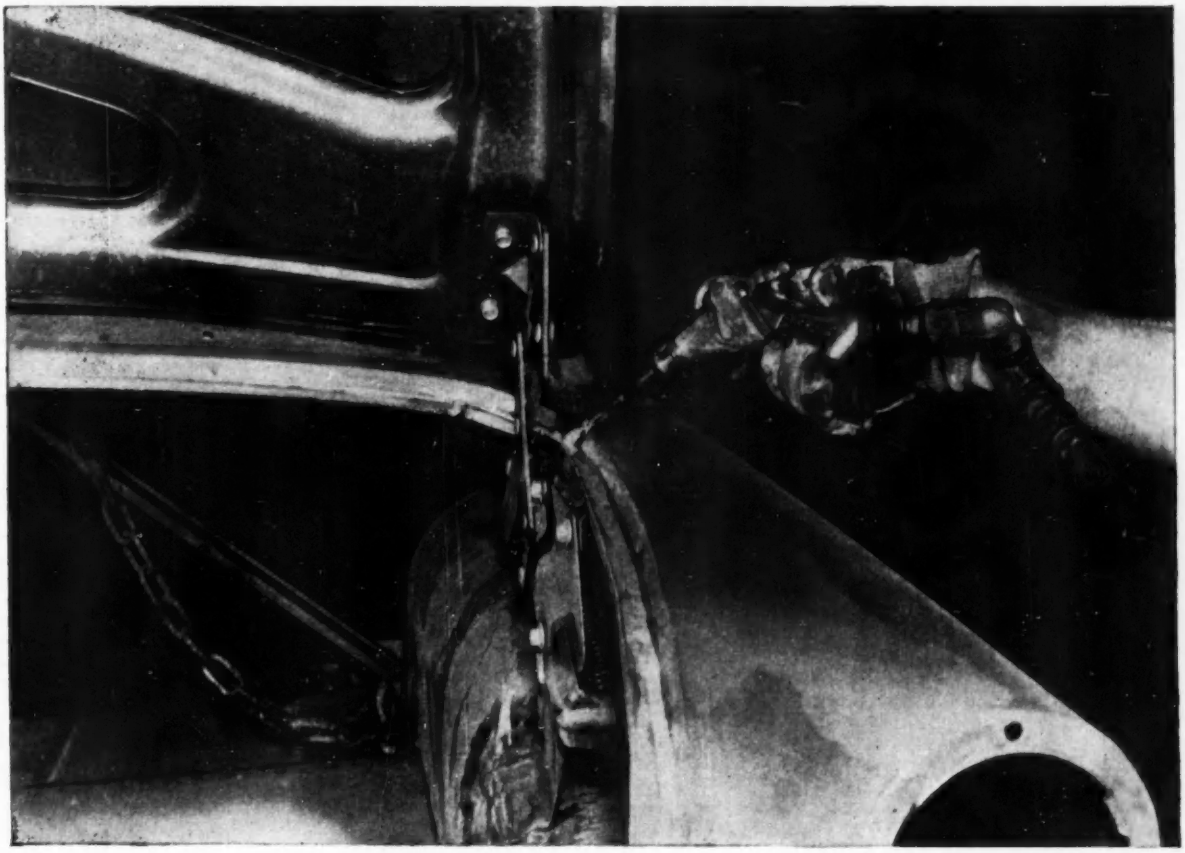
The Savings Bond Division, U.S. Treasury Department, Washington, D. C., is ready to provide all the help you need in the way of Application Blanks, literature, and a complete outline of a simple, person-to-person canvass that will put an application blank in the hands of *every* one of your employees. Your employees will do the rest.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

AUTOMOTIVE INDUSTRIES

Another new development using

B. F. Goodrich Chemical *raw materials*



B. F. Goodrich Chemical Company does not manufacture this plastic sealant. We make the Geon paste resin only.

WEATHER-PROOFED FOR THE LIFE OF THE CAR—with Geon!

CARS have vital spots where a dependable weather-sealant is a "must". And that's where Geon paste resin does a great protective job!

A plastic compound, made from this resin, is applied with air guns as cars move along the production line. Operators shoot the liquid-like vinyl plastic into the drip-guard rail around the car top, around the windshield frame, and along the trunk where rain, snow or dirt might leak past spot-weld seams into the car.

The easy-flowing plastic compound adheres tightly to the bare metal body. After the car is painted and baked, the sealant is completely fused and will not break off or crack during the life of the car.

This use for Geon paste resin may point out ways to help you improve or develop more saleable products. It can be used in many coating, casting, molding or dipping operations—resists oil, greases and many chemicals. Upholstery, floor mats, trunk linings and electrical parts are only a few products made from Geon. For technical information, please write Dept. HG-12, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

GEON RESINS • GOOD-RITE PLASTICIZERS . . . the ideal team to make products easier, better and more saleable

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON colors

The Forger
ARTICLE 8
MULTIPLE OPERATION FORGINGS HAVING DEEP HOLES THAT DO NOT EXTEND THROUGH THE ENTIRE FORGING
MULTIPLE OPERATION SOCKET WRENCH DIES
SKETCH "A"
MULTIPLE OPERATION FOR DEEP PIERCED FORGING
PROGRESSIVE PIERCING METHOD
SKETCH "B"

aids

TO MODERN FORGING PRACTICE

YOU ARE INVITED to have your name placed on our mailing list to receive this valuable series of articles on up-to-date forging methods. We will be glad to send a complete set of all eleven issues of "The Forger" in addition to placing your name on our mailing list to receive future issues as they are prepared. There is absolutely no charge for this service. We are glad to make this gesture towards the advancement of modern forging practice as executed on ACME XN Forging Machines.

THE HILL ACME COMPANY

ACME MACHINERY DIVISION • **1209 W. 65th St., Cleveland 2, Ohio**
ESTABLISHED 1882

"ACME" FORGING • THREADING • TAPPING MACHINES • ALSO MANUFACTURERS OF "HILL" GRINDING AND POLISHING MACHINES
HYDRAULIC SURFACE GRINDERS • "CANTON" ALLIGATOR SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

G-E MOTOR CONTROL CENTER— 4 EASY-MAINTENANCE FEATURES

1 ACCESSIBLE UNITS (all components on one frame) are interchangeable, terminals front-connected.

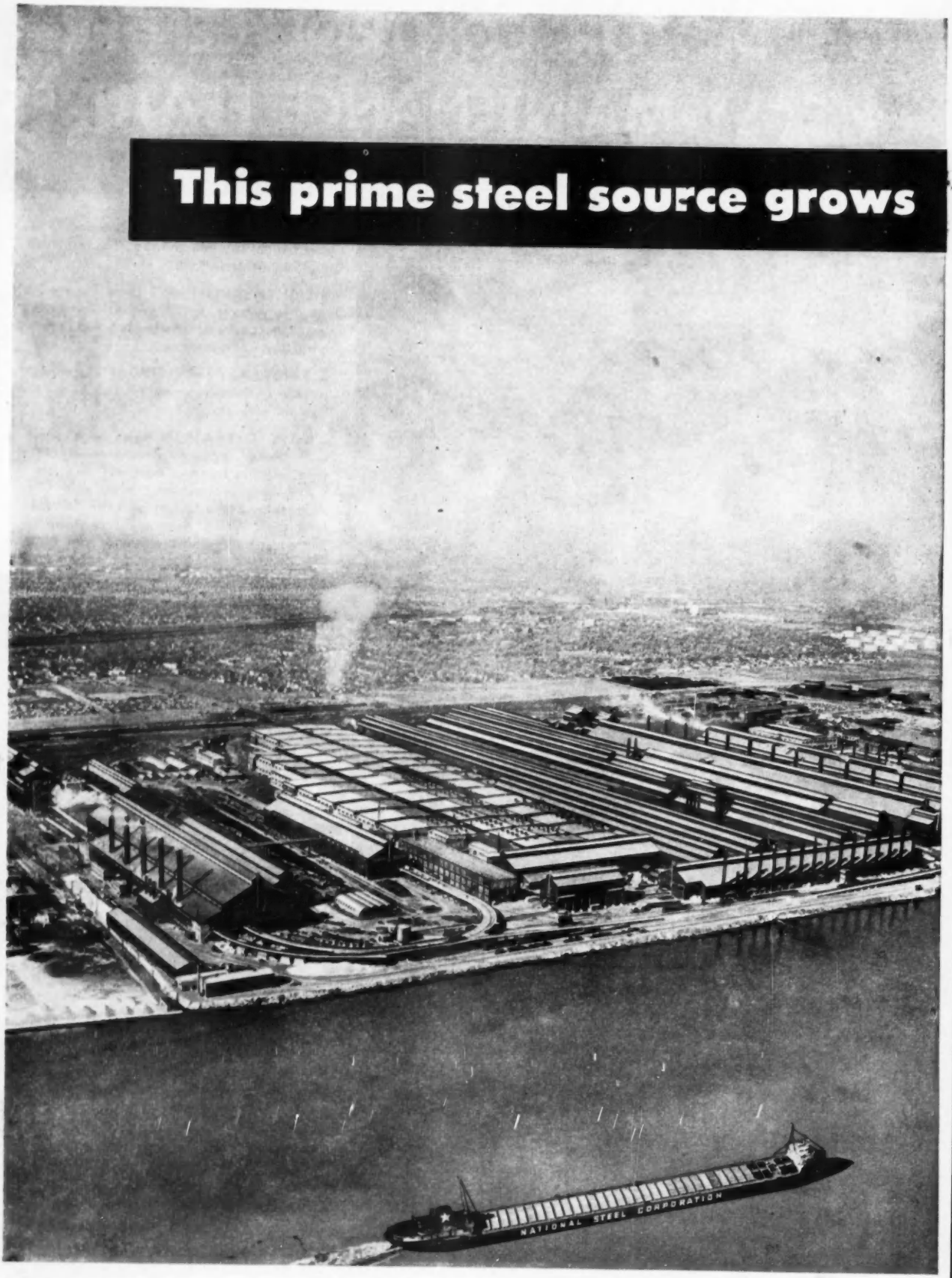
2 LIGHTWEIGHT UNITS (Size 1 only 30 lbs.). To remove, just disconnect terminals. Stab-on connectors make bus ties automatically when replaced.

3 SAFE, EASY SERVICING in "disconnect position." Terminals easily reached; 4" vertical wiring trough.

4 SAFE OPERATION even with some units being serviced. Personnel isolated from live bus by steel barrier.

For more information, contact your G-E Apparatus Sales Office or write for Bulletin GEA-4979A. Section 781-8, *General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC


This prime steel source grows
NATIONAL STEEL CORPORATION

with the automotive industry

Right in the heart of the automotive industry, the steel company set up long ago to become a dependable first source for the car makers is now completing a new stage of growth. Great Lakes Steel—prime supplier of sheet, strip, and other shapes used in vast volume by the motorcar makers—is rounding out an expansion program that increases our annual capacity to *four million ingot tons.* That's about 25% of the automobile men's total needs for steel . . . and about 40% of their needs for the kinds of steel we make.

The way Great Lakes goes at it—starting with the ore and working it through to the finished forms—steelmaking calls for substantial facilities, even by the standards of the mighty automotive industry. We have our own blast furnaces, bessemers and open hearths, blooming mills, hot and cold rolling mills and merchant mills.

Recent expansion has included a huge new blast furnace, a new slabbing mill, and two new bessemers. Coming up in the next few months are seventy new coking ovens, another new blast furnace, additional finishing facilities, and all the extra handling equipment it takes to make things work together.

Through this integration of operations, Great Lakes has built *flexibility* and *availability* unique among steel suppliers. Through this expansion, we mean to take good care of many customers in many fields, while we carry on our service as a dependable first source for the automotive industry. *Great Lakes Steel Corporation, Detroit 29, Michigan.*

Great Lakes Steel

NATIONAL STEEL CORPORATION

GREAT THINGS HAPPEN AT GREAT LAKES STEEL

Multiform
STEEL RULE Dies
STEEL RULE
SINCE 1900

LET US SOLVE YOUR
DIE-CUTTING PROBLEMS
WITH RICHARDS' "TOUGH TEMPER"
STEEL RULE CUTTING DIES

HEADQUARTERS SINCE 1900
FOR DIES AND DIE MAKING
EQUIPMENT AND SUPPLIES

(Punches, Die Boards, Cutting Rule, Eject. Rubber)

FOR AUTOMOTIVE, AIRPLANE, RUBBER,
FELT, INSULATION, SEATING, CORK,
GASKET, TAR BOARD, PLASTICS, ETC.

J. A. RICHARDS CO. 903 N. PITCHER KALAMAZOO, MICH.

Roy W. Lessard, Assistant Chief of Design. Has had extensive aeronautical design and structures experience with many leading aircraft manufacturers and is part of the Fairchild engineering team.

Engineers

AN INVITATION TO YOU TO GO PLACES WITH

FAIRCHILD

A secure future, exceptional opportunities for advancement, and a high starting salary await you at FAIRCHILD. We have openings right now for qualified engineers and designers in all phases of aircraft manufacturing.

Paid vacations, liberal health and life insurance coverage. Premium is paid when longer work week is scheduled.

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD Aircraft Division
HAGERSTOWN, MARYLAND

Men at Work

in the private offices and in all corners of automotive and aviation industrial manufacturing plants, influence the buying of materials, tools, machinery and equipment.

In addition to the buyers whom your own salesmen contact

AUTOMOTIVE INDUSTRIES

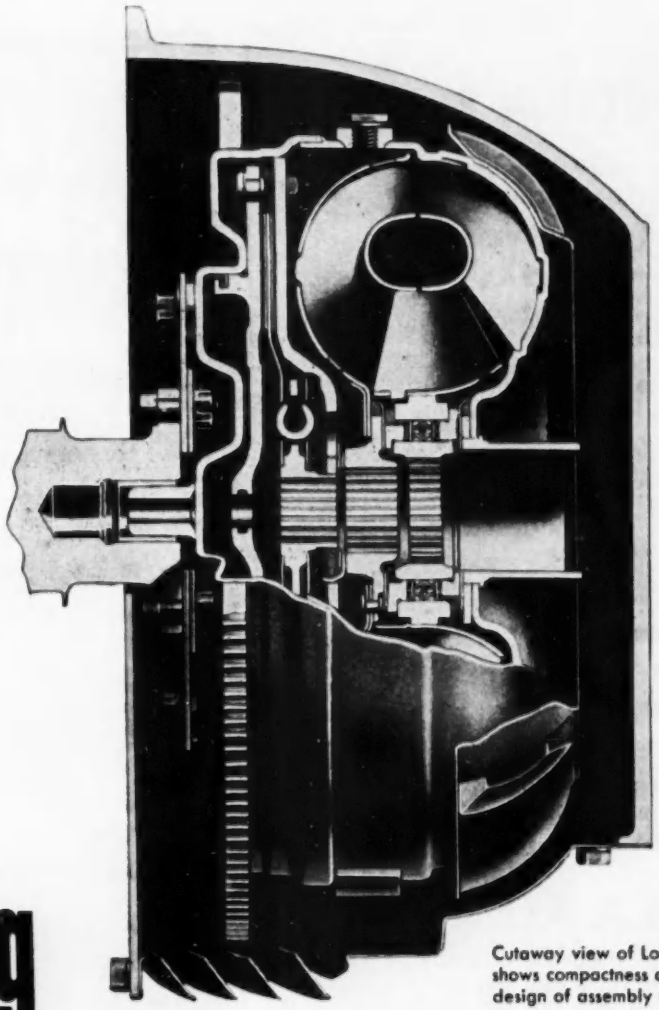
reaches men whose names you'll never know — but whose recommendations may mean millions to you.

Also Automotive Industries helps to create and maintain the good reputation of your product in quarters where that help will do the most good.

Automotive Industries

A Chilton Publication

Chestnut & 56th Sts. Philadelphia 39, Pa.



Cutaway view of Long torque converter shows compactness and clean, functional design of assembly units.

the Long torque converter

50 Years of Quality Manufacturing for the Automotive Industry

LONG

B-W

It combines simple design, low-cost manufacture and high performance. Fabricated almost entirely from stampings. Direct air-cooled for simplicity. Torque multiplication of 2.1 to 1 at stall. Now in production for passenger cars and industrial applications.

LONG MANUFACTURING DIVISION • BORG-WARNER CORPORATION
Detroit 12, Michigan — Windsor, Ontario

TORQUE CONVERTERS • CLUTCHES • RADIATORS • OIL COOLERS

PRODUCTION PLANNER

FOR VOLUME PRODUCTION PLANNING FOR MACHINE ASSEMBLIES—familiar with all types of machine processing. Capable of planning complete manufacturing sequence of gas turbine engines.

UNUSUAL OPPORTUNITY

for a qualified man to join the happiest aircraft family in sunny San Diego. Outstanding employee benefits including profit-sharing, low-cost group insurance and medical care, free polio insurance for self and family, paid tuition for university night school courses, periodic salary merit and adjustment reviews, paid vacations, and many others.

WRITE TO

SOLAR

AIRCRAFT COMPANY

2200 PACIFIC HIGHWAY
SAN DIEGO, CALIFORNIA

AUTOMOTIVE INDUSTRIES

is read by general executives, production men, engineers, purchasing agents and others whose o.k. means orders for those who sell to the World's Largest Manufacturing Industry.

CHAMPION E-X-P-A-N-D-I-N-G MANDRELS

Precision Model

Standard Model

give speed to every set-up

The flexible sleeve, mounted on tapered arbor, expands automatically to fit the hole. Inserted by hand — no arbor press needed. Always an exact, positive, concentric fit. Locked by a single mallet blow. Unlocked the same way. CHAMPION Expanding Mandrels are used in machine shops around the world. Save time, cut production costs, whether the job calls for machining one piece or a thousand.

Precision Model has expansion range of .010". Available in regular sizes to fit holes from ½" to 3" diam. Holds work to tolerances of .0002" run-out. Guaranteed for precision grinding, turning and milling operations.

Standard Model maintains close tolerances, handles material of any length bore, hard or soft metals — from thin tubes and bushings to heavy castings and forgings. A set of fourteen will fit every hole from ½" to 9½" diam.

CHAMPION *Expanding Mandrels can be made in special shapes and sizes to fit any specifications. Quotations on request. Write for descriptive folder today.*

WESTERN TOOL & MFG. CO., INC.
Dept. 21 Springfield, Ohio

OVERSPEED GOVERNORS

SYNCHRO-START PRODUCTS, INC.
8151 N. RIDGEWAY AVE. • SKOKIE, ILLINOIS

See our full page "ad" in the STATISTICAL ISSUE p. 399

FELLOWS

Fellows

MACHINES AND TOOLS FOR **GEAR PRODUCTION**
The Fellows Gear Shaper Company, Springfield, Vt.

TRACK SUPPLIES STRUCTURAL STEEL RAILS

RAILS *New and Relaying!*

TRACK MATERIALS AND ACCESSORIES CARRIED IN STOCK

Switch Material • Spikes and Bolts • Track Tools • Ties • Tie Plates • Bumpers • Complete Side Tracks

BUILDERS STEEL SUPPLY CO.
4201 WYOMING • P.O. BOX 188 • DEARBORN, MICH.

SEND US YOUR INQUIRIES

PIPE and AUTOMOTIVE PLUGS and FITTINGS

Ferrous & Non-Ferrous

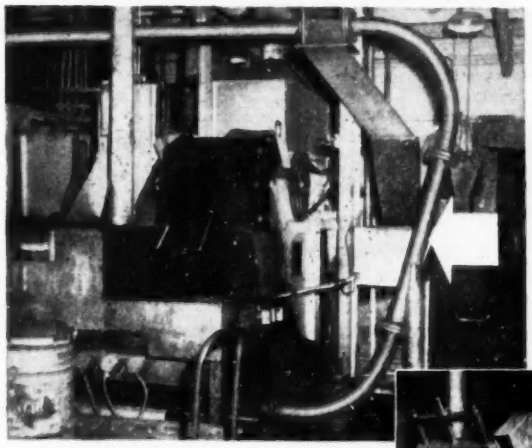
PITTSBURGH PLUG AND PRODUCTS CO.

Pittsburgh 15, Pa. • • • Evans City, Pa.

SEE HOW YOU CAN

HANDLE "HOT JOBS" WITH Hapman TUBULAR CONVEYORS

and save money too!



Chip-handling conveyor will remove chips from coolant.

Cross section showing Sealed-Pin Chain and Neoprene Flights.

THREE MAN-DAYS AND EIGHT HOURS of valuable production time every month were formerly lost in removing scale from the quench tank at Bower Roller Bearing Co., Detroit. An unpleasant job, too!

NOW . . . A HAPMAN TUBULAR CONVEYOR removes the scale *as it collects* . . . takes *no* labor or production time . . . gives *big savings!*

HAPMAN'S UNIQUE, *patented* "Sealed-Pin Chain" construction is highly resistant to abrasive and corrosive action . . . gives greater chain life . . . cuts operating costs. Solid, *tubular* design is liquid-tight.

LET HAPMAN TUBULAR CONVEYORS handle *your* "hot jobs" . . . save *you* money . . . boost *your* efficiency. Get all the details.

WRITE TODAY FOR BULLETIN AI-1253.

Hapman CONVEYORS, INC.
DIVISION HAPMAN DUTTON COMPANY
KALAMAZOO MICHIGAN

For ROUGH TOUGH HARD going

Milsco MILWAUKEE

SENIOR CONTOUR NO. 1893

Cushion Seats

MILSCO BRINGS YOU NEWEST ADVANTAGES IN SEATING COMFORT AND DURABILITY

COMMANDER NO. 1144

With or Without Fore and Aft Attachment

Improved driver-comfort is one of today's major engineering objectives . . . and Milsco can help you to step up the man-work-factor of your equipment with job-fitted cushion seating. Milsco Cushion Seats are the developments of years of experience in designing and manufacturing heavy duty cushion seats for all types of mobile equipment. Our field studies of enduring cushioning materials and contour body support may prove of important value to you. Write us about your seating problem now.

Sold Only to Original Equipment Manufacturers

ESTABLISHED 1924

Milsco MILWAUKEE

MILSCO MANUFACTURING CO.
2730 N. 33rd ST., MILWAUKEE 45, WIS.

Index to

The Advertisers' Index is published as a convenience, care will be taken to index correctly. No allowance

A

AC Spark Plug Div. .... —
Acadia Div. Western Felt Works .... —
Ace Plastic Co. 120
Acushnet Process Company .... —
Aeroquip Corporation .. —
Aetna Ball & Roller Bearing Co. .... —
Airborne Accessories Corp. 102
Airtex Products, Inc. .... —
Ajax Manufacturing Co., The .... —
Allegheny - Ludlum Steel Corp. 139
Allen Mfg. Co. .... —
Allied Products Corp. .... —
Allison Division GM .... —
Allmetal Screw Products Co., Inc. .... —
Aluminum Co. of Amer. 42
Aluminum Industries, Inc. 21
American Bosch Corp. .... —
American Brakeblok Div. —
American Broach & Machine Co. 29
American Chain & Cable Co. .... —
American Chemical Paint Co. .... —
American Cystoscope Makers, Inc. 133
American Machine & Foundry Co. .... —
American Non-Gran Bronze Co. .... —
American Steel & Wire Div. 75
American Steel Foundries 135
Amplex Div. Chrysler Corp. 117
Apex Machine & Tool Co. .... —
Armstrong Cork Co. 7
Aro Equipment Corp. .... —
Associated Spring Corp. —
Atlantic Abrasive Corp. 128
Automatic Spring Coiling Co. .... —
Automotive Gear Works 43

B

Babcock & Wilcox Co., Tubular Products Div. 123
Baird Machine Co., The 76
Bakelite Co., Div. Union Carbide & Carbon Corp. —
Baldwin-Lima-Hamilton Corp. .... —
Barber-Colman Co. .... —
Barnes Co., Wallace .... —
Barnes, W. F. & John. 24-25
Barnes-Gibson-Raymond —
Bendix Aviation Corporation
Bendix Products Div. 30
Eclipse Machine Div. —
Scintilla Magneto Div. 133
Stromberg-Elmira Div. —
Zenith Carburetor Div. —
Bendix - Westinghouse Automotive Air Brake Co. .... —
Bethlehem Steel Co. 11
Black & Decker Mfg. Co. —
Bliss Co., E. W. .... —
Blood Bros. Machine Co. —
Bodine Corporation, The —
Borg & Beck Div. .... —
Borg-Warner Corp. .... —
Bowser Technical Refrigeration .... —
Brainard Steel Div. Sharon Steel Corp. .... —
Brown Corp., The 114
Brush Electronics Co. .. —
Buckeye Tools Corp. .. —
Buhr Machine Tool Co. .. —
Builders Steel Supply Co. 158
Bullard Company, The . 6
Bundy Tubing Company .... —
Burdett Mfg. Co. .... —
Burton Auto Spring Corp. .... —

C

Camcar Screw & Mfg. Corp. .... —
Campbell, Wyant & Cannon Foundry Co. .... —
Carboloy Dept. of General Electric Co. .... —
Cardox Corp. .... —
Chambersburg Engineering Co. .... —
Chandler Products Corp. 120
Chicago Rawhide Mfg. Co. .... —
Chicago Rivet & Machine Co. .... —
Chicago Screw Co., The —
Chrysler Corp. (Amplex Div.) 117
Cincinnati Milling Machine Co. 32
Clark Equipment Co. 122
Classified Advertisement 120
Clearing Machine Corp. —
Clearprint Paper Co. .... —
Cleveland Container Co. —
Cleveland Metal Abrasive Co. .... —
Cleveland Punch & Shear Wks. Co., The .... —
Climax Molybdenum Co. 102
Colonial Broach Co. 121
Columbia - Geneva Steel Div. 75-147
Cone Automatic Machine Co., Inc. .... —
Continental - Diamond Fibre Co. .... —
Continental Motors Corp. —
Continental Screw Co. .... —
Continental Tool Works Div. .... —
Coolidge Corp. .... —
Copperweld Steel Co. 91
Cotta Transmission Co. 1
Cross Company, The .. 12
Cummins Engine Co. .... —

D

Danly Machine Specialties, Inc. 107
Davis & Thompson Co. —
Delco Products Div. G.M. 129
Delpark Corp. .... —
Detrex Corp. .... —
Detroit Stamping Co. .. —
Do-All Co., The .... —
Doehler-Jarvis Div. National Lead Co. 112-113
Dole Valve Co., The .... —
Dollinger Corp. 74
Donaldson Co., Inc. .... —
Dow Corning Corp. .... —
Dow Furnace Co. .... —
Dumore Co. .... —
Dunbar Brothers Co. .... —
du Pont de Nemours & Co., Inc., E. I. 15
Dykem Co., The .... —
Dynamatic Corp. 8

E

Eaton Manufacturing Co. 8-77
Ekstrom, Carlson & Co. —
Elastic Stop Nut Corp. —
Elco Tool & Screw Corp. —
Electric Furnace Co., The .... —
Electric Storage Battery Co. .... —
Elmes Engineering Div. 135
Elwell-Parker Electric Co. .... —
Evans Products Co. 141
Ex-Cell-O Corp. 9
Excelsior Leather Washer Mfg. Co. .... —

F

Fafnir Bearing Co. .... —
Fairchild Engine & Airplane Corp. 156
Fairfield Mfg. Co. .... —
Federal-Mogul Corp. .... —
Fellows Gear Shaper Co., The 158
Flexonics Corp. .... —
Foote - Burt Company, The .... —
Formsprag Company .... —
Fostoria Pressed Steel Corp. .... —
Frenchtown Porcelain Co. .... —
Frontier Bronze Corp. .. —
Frostrode Div. of Viking Products 115
Fuller Manufacturing Co. —

G

G & O Mfg. Co., The .... —
Garrett Co., Inc., Geo. K. 145
Gear Grinding Machine Co. 138
Gemmer Mfg. Co. .... —
General Electric Company 143-153
Gibson Co., Wm. D. .... —
Gisholt Machine Co. 97
Gits Bros. Mfg. Co. 146
Globe-Union, Inc. .... —
Goodrich Chemical Co., B. F. 151
Gordon Co., Claud S. .... —
Great Lakes Steel Corp. 154-155
Greenlee Bros. & Co. .... —
Greer Hydraulics, Inc. .. —
Gunite Foundries Corp. . —

H

H & H Tube & Mfg. Co. —
Hall Lamp Co., C. M. .. 109
Handy & Harman .... —
Hannifin Corp. .... —
Hansen Mfg. Co. .... —
Hapman Conveyors, Inc. 159
Harrison Radiator Div. .. —
Hartford Special Machinery Co. .... —
Hartford Steel Ball Co., The 100
Heald Machine Co. .... —
Henry & Wright Div. Emhart Mfg. Co. .... —
Herbrand Division, The Bingham-Herbrand Corp. .... —
Hill Acme Company, The 152
Holcroft & Co. .... —
Holley Carburetor Co. .. —
Honan-Crane Corp. .... —
Houghton & Co., E. F. —
Hyatt Bearings Div. .... —
Hydro-Line Mfg. Co. .... —
Hy-Pro Tool Co. .... —

I

Illinois Tool Works .... —
Industrial Filter & Pump Mfg. Co. .... —
Industrial Filtration Co. —
Ingersoll-Rand .... —
Inland Manufacturing Div. .... —
International Nickel Co., Inc. 2

J

Janitrol Div. Surface Combustion Corp. .... —
Johnson Bronze Co. .... —
Johnson Products, Inc. .. —
Jones & Laughlin Steel Corp. .... —
Jones Motrola Corp. .... —

K

Kearney & Trecker Corp. 101
Kelsey-Hayes Wheel Co. —
Kent-Owens Machine Co. —
King-Seeley Corporation —
Kingsbury Machine Tool Corp. .... —
Klem Chemicals, Inc. .. 126
Korfund Co., Inc. 132

L

Lake Erie Engineering Corp. .... —
Lake Shore Engrg. Co. .. —
Lamb Electric Company —
LaPointe Machine Tool Co. 47
Leece-Neville Co., The . 130
Leeds & Northrup Co. .. —

Advertisers

and not as part of the advertising contract. Every will be made for errors or failure to insert.

Libbey-Owens-Ford Glass Co. — Lincoln Electric Co. — Link-Belt Co. — Lipe-Rollway Corp. — Littell Machine Co., F. J. — Logan Engineering Co. — Long Manufacturing Div. 157 Lord Manufacturing Co. — Lycoming Div. Avco Mfg. Corp. 46

M

McKay Machine Co., The — McLouth Steel Corp. — Magnaflux Corp. — Mahon Co., The R. C. — Mallory & Co., Inc., P. R. 18 Markem Machine Co. 106 Master Parts Div., Airtex Prod., Inc. — Mattison Machine Works — Mechanics Universal Joint Div. 20 Michigan Tool Co. — Midland Steel Products Co. 110 Miehle-Dexter Supercharger Div. — Miller Motor Co. — Milsco Mfg. Co. 159 Milwaukee Div. — Minnesota Mining & Mfg. Co. 142 Moline Tool Co. — Monarch Machine Tool Co. — Moraine Products Div. — Morris Machine Tool Co. — Motch & Merryweather Machinery Co. — Murray-Way Corp. 144 Muskegon Piston Ring Co. —

N

N-A-X Alloy Division — Nadella — Nankervis Co., George L. 118 National Acme Co., The 119 National Broach & Machine Co. — National Lead Co. 112-113 National Machinery Co. — National Metal Edge Box Co. 136 National Motor Bearing Co. — National Screw & Mfg. Co. — National Steel Corporation — National Tube Div. 75-147 New Britain Machine Co., Gridley Machine Div. 44 New Departure Div. — Niagara Machine & Tool Wks. 137 Northwest Chemical Co., Inc. — Norton Company —

O

O & S Bearing & Mfg. Co. — Oakite Products, Inc. — Ohio Crankshaft Co. — Ohio Division — Ohio Seamless Tube Div., The 78 Orban Co., Inc., Kurt — Ortman-Miller Machine Co. 103 Osborn Manufacturing Co. —

P

Page Steel & Wire Div., Amer. Chain & Cable Co., Inc. — Painut Company, The — Pangborn Corp. — Parker Appliance Co. — Parker Rust Proof Co. 148-149 Pennsylvania Salt Mfg. Co. — Perfect Circle Corp. 95 Perfection Stove Co. — Permold Company — Pesco Products Div. Borg-Warner Corp. — Pheoll Manufacturing Co. — Pierce Governor Co., Inc. — Pines Engineering Co., Inc. — Pittsburgh Plug & Products Co. 158 Pittsburgh Steel Co. (Thomas Strip Div.) — Plastic Research Products — Polyken Industrial Tapes Dept. of Bauer & Black — Potter & Johnston Co. — Pratt & Whitney Div., Niles-Bement-Pond Company — Precision Rubber Products Corp. 45 Presstite Engineering Co. — Purolator Products, Inc. —

R

Ransburg Electro-Coating Corp. 116 Rathbone, Hair & Ridgway Box Co. — Raybestos-Manhattan, Inc. (Equipment Sales Div.) 22-23 Raymond Mfg. Co. — Reliance Div. Eaton Mfg. Co. — Reliance Electric & Engrg. Co. — Republic Steel Corp., (Steel & Tubes Div.) 127 Revere Copper & Brass, Inc. 19 Reynolds Metals Co. — Reynolds Wire Div. — Richards Co., J. A. 156 Rinshed-Mason Company — Rockford Clutch Div. — Ross Gear & Tool Co. — Roto-Finish Co. — Russell, Burdsall & Ward Bolt & Nut Co. — Ryerson & Son, Inc. Joseph T. —

S

SKF Industries, Inc. 26 Saginaw Steering Gear Div. — Sanborn Company — Schmieg Industries, Inc. — Schwitzer-Cummins Co. 73 Sealed Power Corporation — Seneca Falls Machine Co. 134 Service Spring Co. — Shakeproof Div. — Sheffield Corp., The 5 Shuler Axle Co., Inc. Back Cover Simmons Fastener Corp. 10 Simonds Abrasive Co. — Skinner Electric Valve Div. — Solar Aircraft Co. 158 Sorensen & Co., Inc. — Sperry Products, Inc. 140 Spicer Mfg. Div. Dana Corp. — Standard Oil Co. (Ind.) 2nd Cover Standard Pressed Steel Co. 28 Standard Tube Company — Steel Products Engineering Co. — Sterling Aluminum Products, Inc. 99 Stewart-Warner Corp. 17 Strom Steel Ball Co. 140 Sturtevant Co., P. A. — Subscription Post-Card 40 Sun Electric Corp. — Sun Oil Company — Sundstrand Machine Tool Co. 124-125 Superior Steel Corp. — Synchro-Start Products, Inc. 158

T

Taylor Dynamometer & Machine Co. — Taylor-Winfield Corp. — Temco Aircraft Corp. — Tennessee Coal & Iron Div. 75 Texas Company, The 4 Thompson-Bremer & Co. — Thompson Products, Inc. 93 Timken Roller Bearing Co., The — Tinnerman Products, Inc. — Tomkins-Johnson Company, The — Torrington Co., The — Towmotor Corporation — Transue & Williams Steel Forging Corp. — Tung-Sol Electric, Inc. — Tuthill Pump Co. 162 Tuthill Spring Co. 108 Twin-Disc Clutch Co. —

U

Union Carbide & Carbon Corp. (Bakelite Co.) — Union Tool Corp. — United Engine & Machine Co. — United Specialties Company — United States Rubber Co. — United States Steel Corp. 75-147 United States Steel Supply Div. — United States Treasury Dept. 150 Universal Products Co., Inc. 104

V

Vanadium Corp. of Amer. — Vellumoid Co., The — Vickers, Inc. 111 Victor Manufacturing & Gasket Co. — Vinco Corp. —

W

Wagner Electric Corp. — Waldes-Kohinoor, Inc. 13 Waterman Products Co. — Waukesha Motor Company — Wean Equipment Corp. — Webb Co., Jervis B. 131 Wellman Co., S. K. — Wellman Bronze & Aluminum Co., The — Western Felt Works 14 Western Tool & Mfg. Co. 158 Westinghouse Electric Corp. — Wheland Company, The — White Dental Mfg. Co., S. S. — Whittington Pump & Engrg. Corp. — Williams & Co., J. H. — Wisconsin Motor Corp. — Wyman-Gordon 16

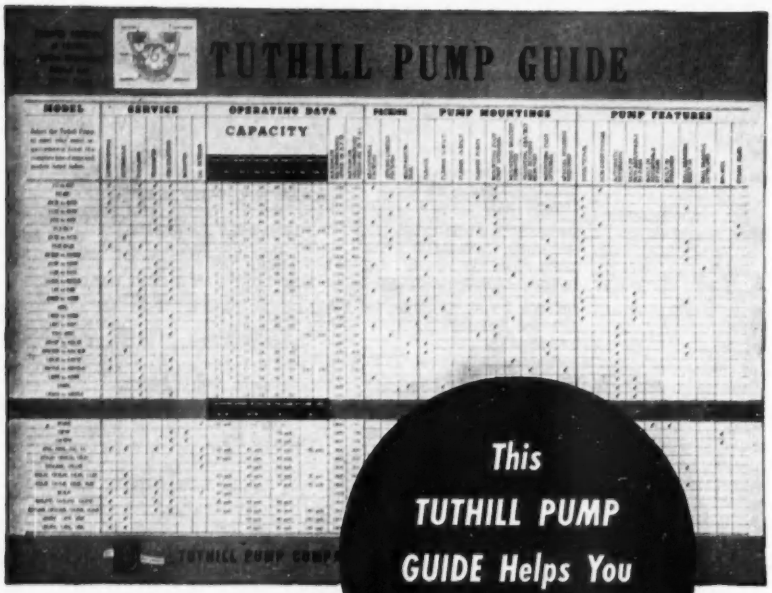
Y

Yale & Towne Mfg. Co., The 27 Yates-American Machine Co. — Young Radiator Company 105 Young Spring & Wire Corp., L. A. — Youngstown Sheet & Tube Co. —

Z

Zagar Tool, Inc. — Zollner Machine Works 3rd Cover

NEW EASY WAY TO SELECT THE RIGHT PUMP FOR THE JOB



This TUTHILL PUMP GUIDE Helps You Find the Answer

To save you time and trouble in selecting the pump best-suited to your application, Tuthill engineers have developed this revolutionary new Pump Guide. Here, in one easy-to-use chart, is a volume-full of information on the complete line of Tuthill Pumps.

At a glance, it shows you the services for which each model is built, together with performance characteristics, types of packing, mounting styles and distinctive features that enable you to fit the pump to your need, rather than the need to the pump.

Copies of this helpful guide are now available on request. Write for yours today—there's no obligation.

Tuthill Positive Displacement Pumps serve Industry in Lubrication, Hydraulic, Coolant, Oil Burning, Circulating and Transfer Service.

TUTHILL PUMP COMPANY
939 East 95th Street, Chicago 19, Illinois

PUMP GUIDE

for Maintenance Men...

NEW CATALOG ON

TUTHILL MODEL CK HIGH-PRESSURE PUMPS

NOW READY TO HELP YOU

This concise book gives you types and sizes of Tuthill High Pressure Pumps to meet any requirement for hydraulic service where the operating pressure does not exceed 400 p.s.i. Included is data on the following types in capacities from 5 to 200 g.p.m.

MODEL CK—Compact, self-priming, uni-directional. Spring-loaded packing. Direct drive or belted units.

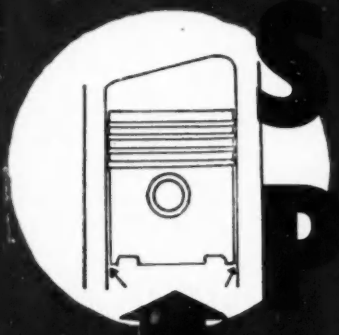
MODEL CKB—Same as Model CK, with dependable Tuthill mechanical shaft seal.

MODEL RCK—Includes Tuthill's exclusive automatic reversing feature. Available also with mechanical seal as Model RCKB.

Write for Tuthill Catalog No. 103 today.

TUTHILL PUMP COMPANY
Dependable Rotary Pumps since 1927
939 East 95th Street, Chicago 19, Illinois

Canadian Affiliate:
Ingersoll Machine & Tool Company, Ltd.
Ingersoll, Ontario, Canada



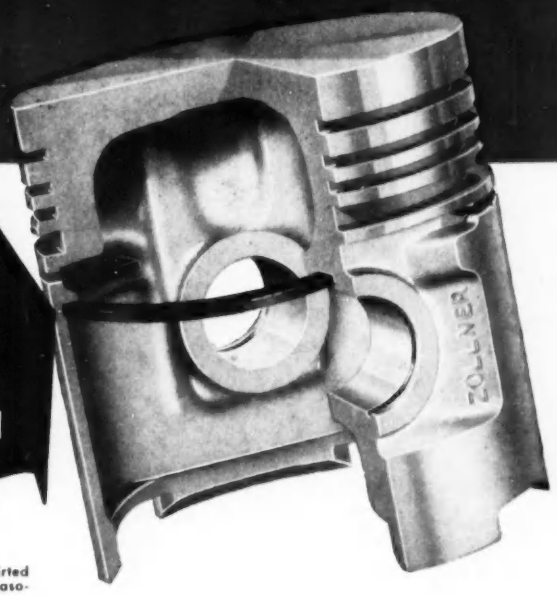
SPECTACULAR PERFORMANCE

UNIFORM EFFECTIVE SKIRT CLEARANCE AT ALL TEMPERATURES

ZOLLNER CLEAR-O-MATIC* PISTONS

*T. M. Reg. Pat. App. For

STEEL TENSION MEMBER
Anchored only at pin bosses and cast in positive contact with I. D. of piston skirt
Controls Clearance Automatically



Design adaptable to full skirted or slipper-type pistons for gasoline engines for every purpose.

Heralded by engine builders everywhere as sensational, the Zollner developed CLEAR-O-MATIC Piston *reduces required clearance to less than .001 with positive uniformity of skirt bearing under all temperatures.* The steel tension member incorporates in the aluminum piston the same effective expansion as the ferrous cylinder itself. Spectacular in performance, the CLEAR-O-MATIC Piston results in a *quiet engine with no cold slap, reduced friction without loss of durability or heat conductivity.* We suggest an immediate test of these advantages in your engine.

1. Clearance maintained uniformly at all coolant temperatures from 20° below zero to 200°F.
2. Effective expansion identical with ferrous cylinder.
3. Steel tension member, with same effective expansion as cylinder, maintains uniform skirt clearance through entire temperature range.
4. Normal diametric clearance usually less than .001 with uniform skirt bearing.
5. Durability and conductivity comparable to heavy duty design.

ZOLLNER

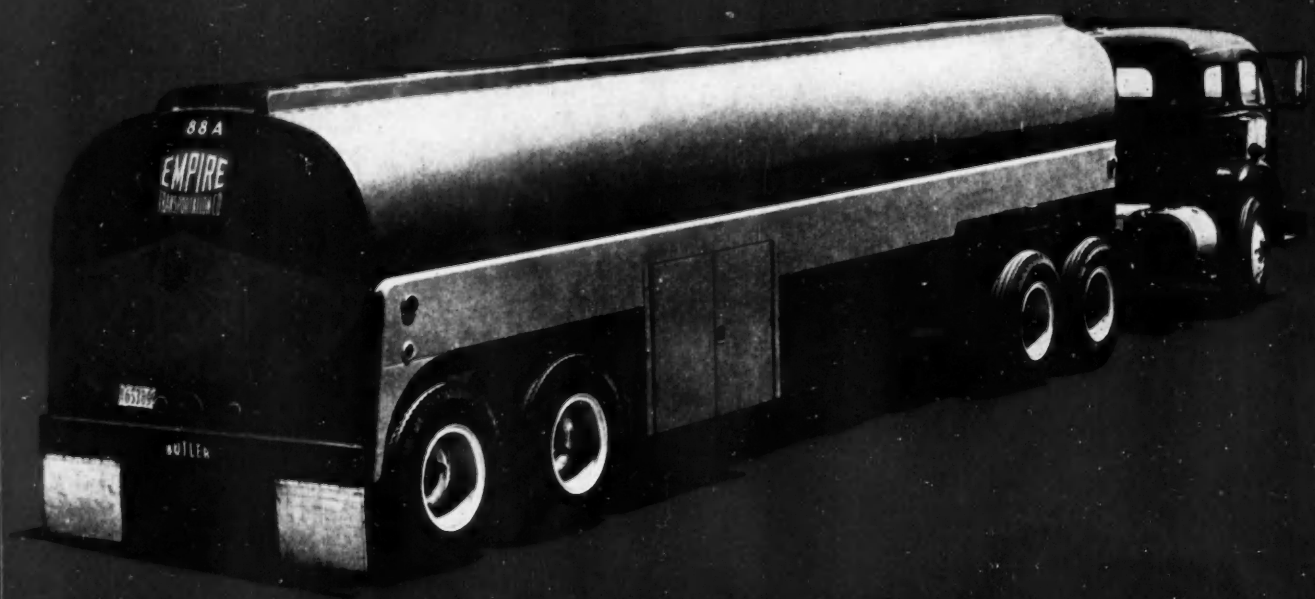
The Original Equipment **PISTONS**

- ADVANCED ENGINEERING
- PRECISION PRODUCTION in Cooperation with Engine Builders

ZOLLNER MACHINE WORKS • FORT WAYNE, IND.

BUTLER

USES SHULER AXLES



THERE ARE NO BETTER AXLES, AT ANY PRICE!

Since 1915, Manufacturers of: *One-Piece* Tubular and Square Commercial Trailer Axles, Heavy-Duty Front Axles for Trucks, Busses, and Off-Highway Equipment, Low-Bed Machinery Trailer Axles, Heavy-Duty Vacuum and Air Brakes, Miscellaneous Forgings.

SHULER AXLE COMPANY, Incorporated, LOUISVILLE, KENTUCKY

SUBSIDIARY OF FULLER MANUFACTURING COMPANY

SALES OFFICES in DETROIT, CHICAGO, OAKLAND and FORT WORTH

WEST COAST WAREHOUSE
2515 Magnolia St., Oakland

SOUTHWEST WAREHOUSE
301 N. W. 28th St., Fort Worth